

# ROADS AND STREETS

MAY 1949

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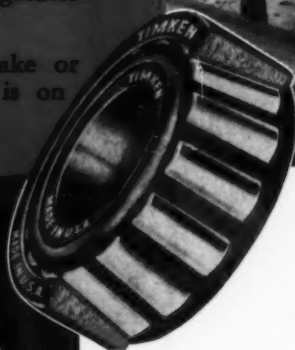
## 7 MILE CONVEYOR KEEPS ROLLING ON **60,000** TIMKEN® BEARINGS

Constructed in 21 sections, this conveyor delivers crushed rock from the surge pile seven miles away to Bull Shoals, Arkansas where the huge Bull Shoals dam is under construction. The conveyor belts are carried on 10,000 Robins troughing idlers—equipped with 60,000 Timken bearings.

Robins idlers rely on Timken bearings because they give trouble-free performance with minimum attention. They turn smoothly and freely under the heaviest loads. Conveyor belt wear is reduced because there's no drag.

Timken tapered roller bearings permit tighter closures which retain lubricant, keep out dust and water, reduce maintenance time. They carry radial and thrust loads in any combination. Timken bearings are made of the finest steel ever developed for tapered roller bearings . . . Timken fine alloy steel, assuring greater endurance, longer life.

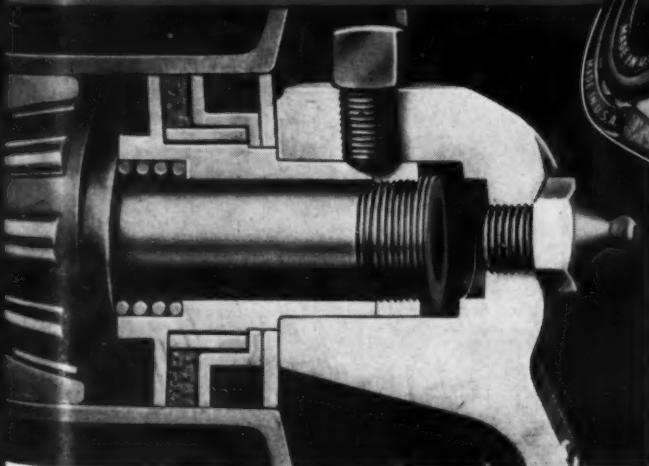
No matter what kind of equipment you make or buy, make sure the trade-mark "TIMKEN" is on every bearing.



**THE TIMKEN ROLLER BEARING  
COMPANY - CANTON 6, OHIO**  
CABLE ADDRESS "TIMROSCO"

How Hewitt-Robins, Inc.  
keep idlers turning freely  
and frictionlessly on Timken  
tapered roller bearings.

**TIMKEN**  
TRADE-MARK REG. U. S. PAT. OFF.  
**TAPERED ROLLER BEARINGS**



NOT JUST A BALL ○ NOT JUST A ROLLER □ THE TIMKEN TAPERED ROLLER □ BEARING TAKES RADIAL ○ AND THRUST —○— LOADS OR ANY COMBINATION ☼

# "AT YOUR DISPOSAL"\*

**SICARD**

## SANIVAN

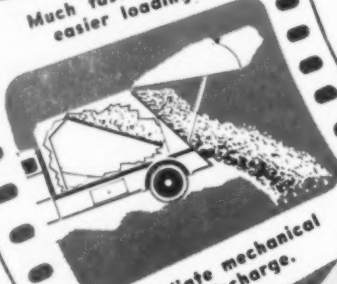
*Compressed loading*

### GARBAGE COLLECTOR

The streamlined SANIVAN Garbage Collection unit is a credit to any community. It is visual evidence of a progressive efficient administration. It leaves streets cleaner and healthier. Each unit requires less men, less energy and less time. The SANIVAN scores on all points.



Much faster, much easier loading.



Immediate mechanical full discharge.



With SANIVAN'S Loading Hopper at waist level there is no over exertion or time loss.

SANIVAN'S compressor, which crushes the refuse, also mechanically transfers it to the interior. The SANIVAN, thus, carries a bigger load without spilling or exposure.

"Yard-by-yard" loading and full hydraulic unloading are exclusive to SANIVAN.

Faster Loading . . . Greater Capacity . . . Fewer Trips . . . Less Equipment . . . Cleaner Streets — all are "At Your Disposal"\* with a Sicard SANIVAN.

\*The Sicard film "At your Disposal" will be shown to civic groups and interested parties upon request.



3 cu. yds. ordinary loose garbage.

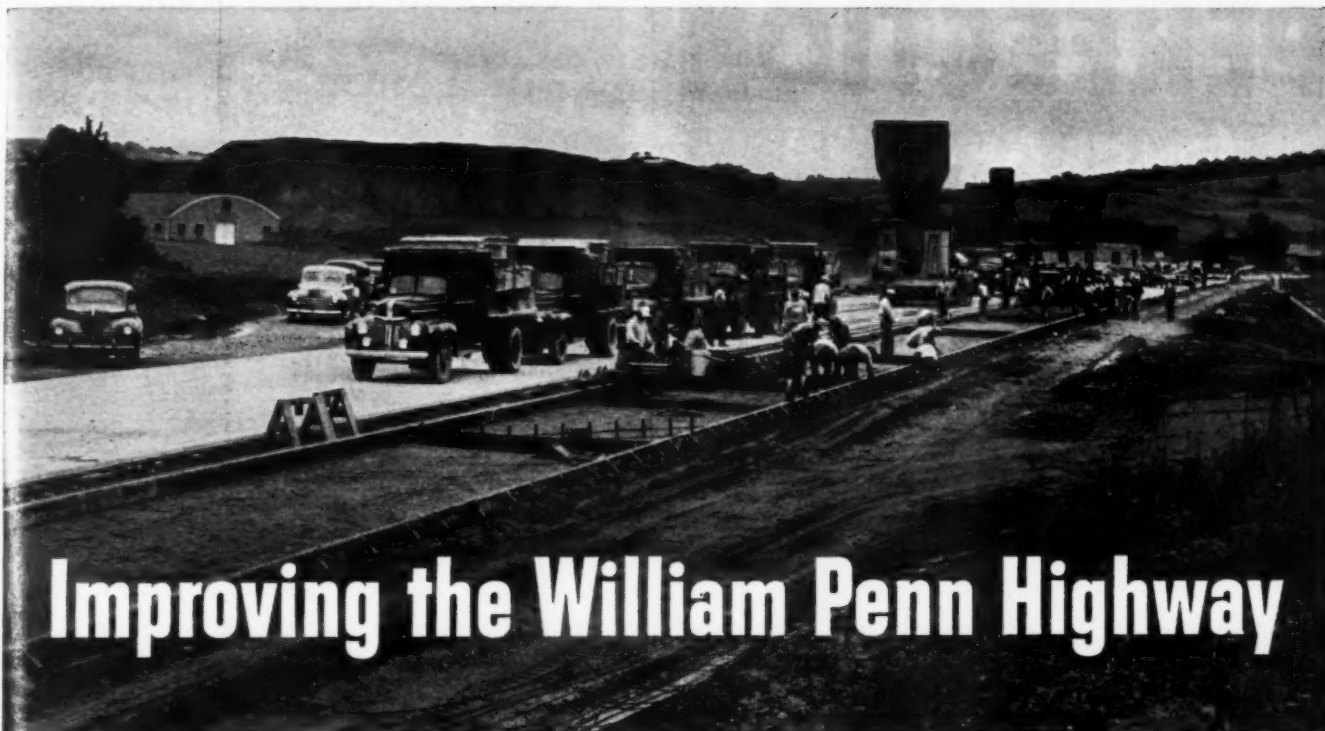


Become 1 cu. yd. compressed garbage.

SICARD INDUSTRIES  
INC.

**SICARD**

753 WEST MAIN ST.,  
WATERTOWN, N.Y.



# Improving the William Penn Highway

Installing tie-bars and keyway as trucks wait turn to dump batch into skip.



Left to right: Bruno Ferrari and John C. Slate, both of Latrobe Road Construction Co., with T. J. McKay, senior construction engineer, Pennsylvania Department of Highways.

As part of its far-reaching road-modernization program, the Pennsylvania Department of Highways recently authorized five miles of relocation on the William Penn Highway, at New Alexandria, Pa. The new road varies in width from two to four lanes. Included in its construction were two bridges and seven culverts. Contractor: Latrobe Road Construction Co., Latrobe, Pa. Steel piling, bar mats, dowel units, and cable guard rail were supplied by Bethlehem.

## BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by  
Bethlehem Pacific Coast Steel Corporation  
Export Distributor: Bethlehem Steel Export Corporation

## STEEL FOR HIGHWAYS

Dowel Units • Reinforcing Bars • Bar Mats • Guard Rail  
Guard Rail Posts • Wire Rope and Strand • Pipe  
Hollow Drill Steel • Spikes • Bolts and Nuts  
Timber Bridge Hardware • Tie-Rods  
Sheet- and H-Piling • Fabricated Structural Steel



—And a big smile for the photographer! Willing hands lift Bethlehem Hinged Bar Mat at batching plant stockpile.



With Bethlehem Hinged Bar Mat in place, screw spreader goes to work on top course. Job used 300 tons of mats.



This reinforced concrete bridge has span of more than 53 ft, and will carry new highway over secondary road.

When writing advertisers please mention **ROADS AND STREETS, May, 1949**

# PERFECTION

IS THE NAME TO  
*Remember*  
WHEN YOU WANT

**EXTRA VALUE**

**IN BODIES  
AND HOISTS**



Photo shows a PERFECTION No. 354 Dump Body (11 yd. capacity) 216" x 84", mounted on trailer. Equipped with

**PERFECTION**



TRADE MARK REG.  
U. S. PATENT OFFICE



PATENTS GRANTED  
AND PENDING

Write for complete information

**THE PERFECTION STEEL BODY CO.**  
Galion, Ohio, U.S.A.

**PERFECTION**  
STAKE and DUMP BODIES  
HYDRAULIC HOISTS



**FOR ANY TRUCK**  
STANDARD or SPECIAL UNITS  
IN ALL SIZES • FOR ANY USE

## ROADS AND STREETS

May, 1949

Vol. 92

No. 5

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A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations, and to the construction and maintenance of airports.

With Roads and Streets Have Been Combined Good  
Roads Magazine And Engineering & Contracting

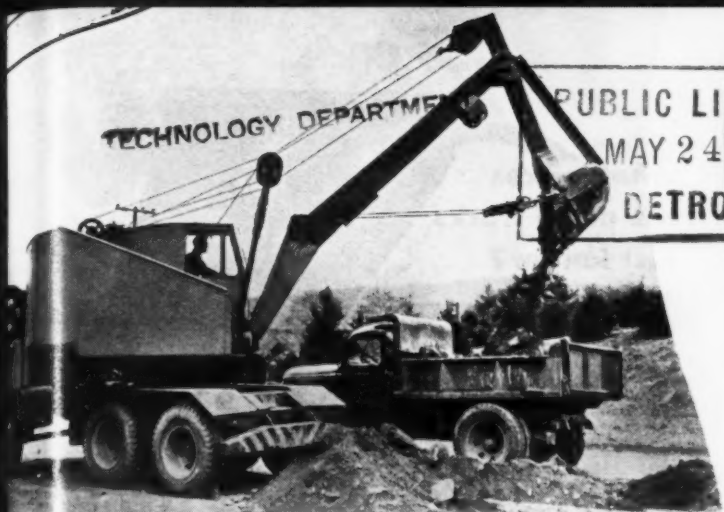
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**ROADS AND STREETS, May, 1949**



# TRAIL BLAZER

*on boulevard or cross-country*

## Lorain TL-20 Moto-Cranes *are cutting* construction costs

Wherever the job—in any kind of going—be it boulevard, rutted back road, or cross-country, your Lorain TL-20 Moto-Crane will take the "short cut" to lower construction costs. Traveling on a rubber-tire mounting, the TL-20 Moto-Crane writes its own transportation ticket between jobs at speeds up to 30 M. P. H.

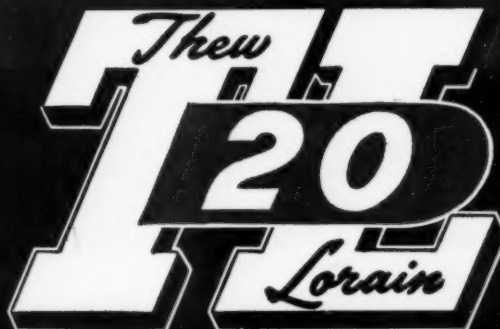
And what if each job does pose a different material handling problem? With interchangeable boom equipment, this "quick change artist" can vary its attack as a shovel, crane, clamshell, dragline or hoe. If you want a machine with rugged dependability and versatility for any type of operation—which will come up with a healthy profit on completion of the job—see your local Thew-Lorain Distributor—today. Ask him to show you TL-20's at work in your locality. You'll find it a "convincing experience."

**THE THEW SHOVEL CO. • Lorain, Ohio**  
Cable Address: UNLOADER

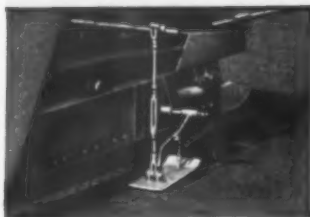
### ONLY TL-20 HAS ALL THESE JOB-TESTED FEATURES

Anti-Friction Bearings • 5 Identical Shoe Clutches  
2 Crawler Speeds (Standard) • Unit Assembly for  
Easier Service • Starter and Generator (Standard)  
9 Rubber-tire Mountings Available • 2 Operating  
Lights (Standard) • Independent Rope Crowd  
Shovel • "Full Circle" Crawler Steering • Drop  
Forged Crawler Treads • All-Purpose Crane Boom  
Interchangeable Parts.

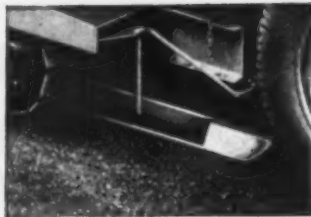
# Lorain®



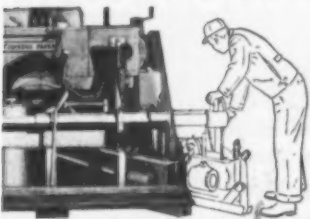
## the Paver of the future **JAEGER'S BP-5**



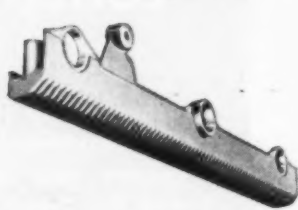
Automatic Grade Matching



12' Equalizing Runners



Instant Width Change up to 12 1/2'



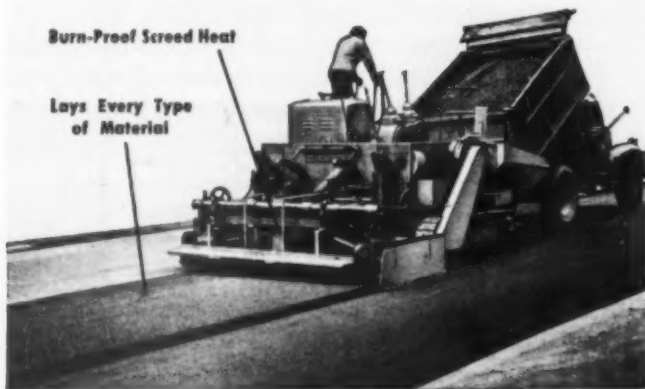
Oscillating Bevel-Tooth Screeds



No Weight to Seal New Mat



Lays Flush to Curbs



Burn-Proof Screed Heat

Lays Every Type of Material

To the basically correct principles of paver design long-proved in earlier model Jaeger pavers, the Model BP-5 adds many important improvements in automatic precision and adaptability to the varied materials and conditions encountered in road, street and airport work. For complete information, see your Jaeger distributor or send for Catalog BP-9. Early deliveries will be limited to orders already on hand.

**THE JAEGER MACHINE CO., Columbus 16, Ohio**

Leading distributors in 130 cities of the United States and Canada sell, rent and service the Jaeger equipment listed below.

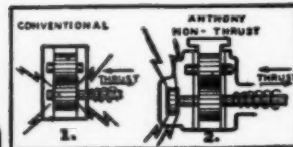
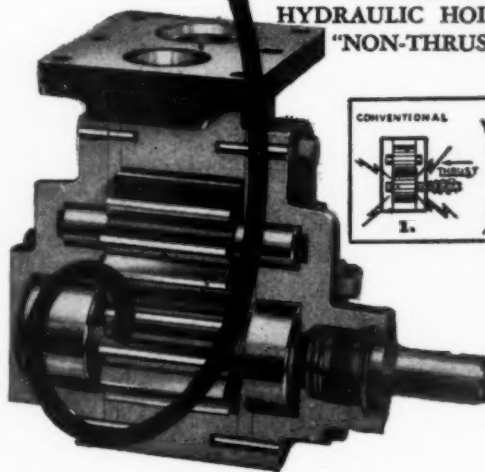
**PUMPS • MIXERS • HOISTS • TOWERS  
CONCRETE and BITUMINOUS PAVING MACHINES**

what makes  
some dump trucks  
last longer?

## The Roller Bearing PUMP with the **NON-THRUST** feature

**ADDS UP TO 700% TO THE LIFE  
OF ANTHONY DUMP TRUCKS**

THE HEART of a dump truck—the pump—plays as important a part in the operation of a dump truck as your heart does to you. And when the pump fails, the hoist fails and the truck stops working. That is why Anthony engineers place such emphasis on the pump. The amazing patented "NON-THRUST" design of the Anthony roller-bearing pump is found in no other hoist at any price. Unlike conventional pumps, its design eliminates the No. 1 cause of pump failure—destructive mechanical thrust on the gears. (See drawings below.) Large roller bearings, extra thick reversible bronze wear plates, pressure lubricated idler gear bearings and precision finished steel gears are other features that give this pump an unequalled field performance record. For *dependable service* **DEPEND ON ANTHONY HYDRAULIC HOISTS with the "NON-THRUST" Pump.**



**ANTHONY**  
HYDRAULIC

**ANTHONY  
COMPANY**  
Streator, Illinois

# WHAT

CRANE  
SHOVEL  
DRAGLINE  
PULLSHOVEL

are you going to  
buy for the Heart  
of Your Job?

**Y**OU have jobs coming up ahead of you—  
jobs you haven't even figured on yet and  
you are going to have *holes* to fill in your  
equipment setup.

Some of these holes are going to be in the  
\*Key Spots, spots where the profit begins,  
spots like this batch plant job where the  
whole setup stops when the Crane stops.

Northwest Cranes, Shovels, Draglines and  
Pullshovels bring you features that keep the  
job running smoother and faster. Such  
advantages as the "Feather-Touch" Clutch  
Control, Uniform Pressure Swing Clutches,  
the Cushion Clutch, Northwest Simplicity  
of Design, Northwest Steering, Northwest  
Dual Independent Crowd and other North-  
west features assure higher output and less  
down time. You can't afford to have anything  
but the best in the heart of the job. Ask  
about these features and plan to fill those  
future equipment needs with Northwests.

**NORTHWEST ENGINEERING CO.**  
1504 Field Bldg., 135 South LaSalle Street  
Chicago 3, Illinois

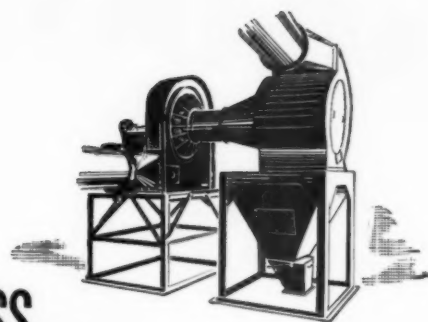


# NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

# ROTO-CLONES mark the spots where aggregate dryers stay in business

**Dust—Public Nuisance No. 1—  
can be controlled effectively**

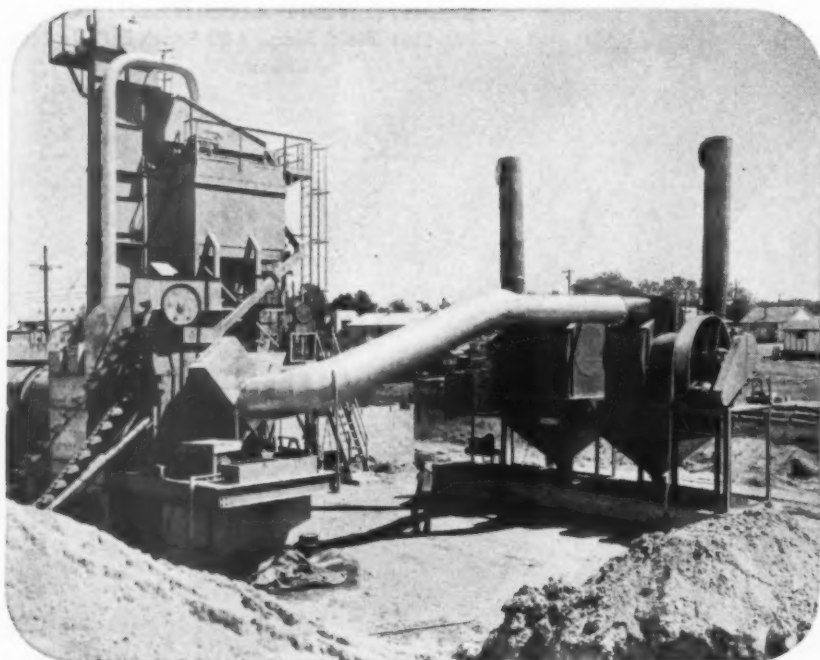


**N**o irate citizens will try to legislate this asphalt plant out of business as a dust nuisance. This wise operator got the jump on public opinion. Aggregate dryer, screen, elevator boot and mixing station—all have been made practically dust-free operations with the installation of Roto-Clone\* equipment.

Recommended equipment for such installations consists of a Skimmer Precleaner used in conjunction with a Type W Roto-Clone (Arrangement A). The dust-laden air is first drawn into the Precleaner where a high percentage of the material is collected dry for salvage.

From the Precleaner, the air passes into the Type W Roto-Clone where dynamic precipitation is combined with water sprays to trap the finest and lightest dust particles. The air is then exhausted dust-free while the collected material and water are discharged in the form of a thin slurry.

Dust control is good business if you want to stay in business. Its cost? Surprisingly low. Complete Roto-Clone data can be obtained from your local AAF representative or by writing direct to—



## **AMERICAN AIR FILTER COMPANY, INC.**

306 Central Avenue, Louisville 8, Ky.

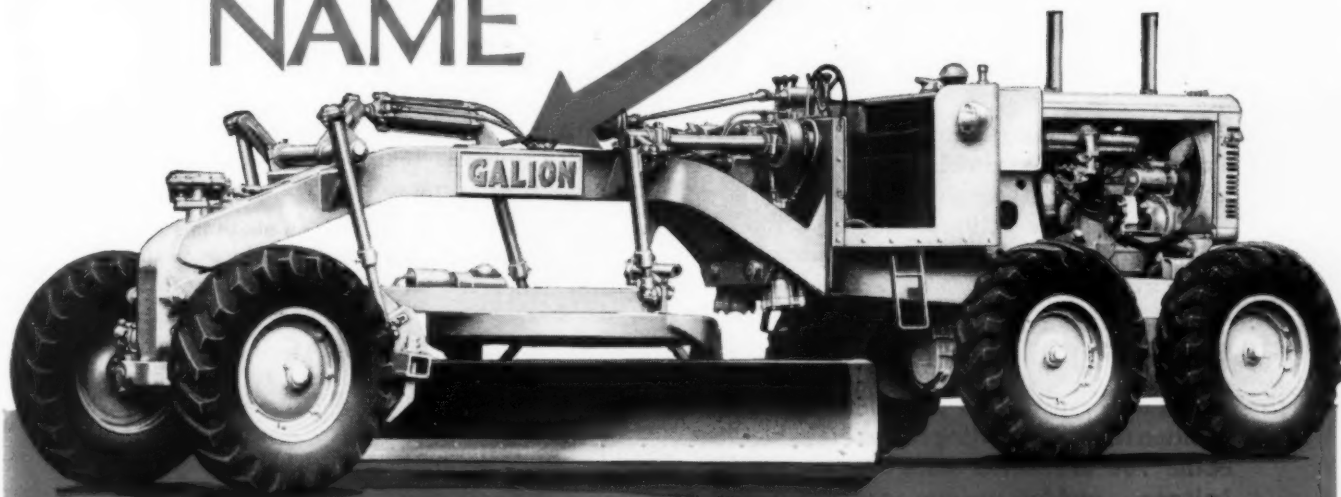
In Canada: Darling Bros., Ltd., Montreal, P. Q.

\*Roto-Clone is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.



**ROTO-CLONE®**  
**DUST CONTROL EQUIPMENT**

LOOK  
for this  
NAME



the mark of  
**SUPERIORITY**  
in  
Motor Graders

The name "GALION" on  
a Motor Grader represents  
superiority in design, con-  
struction, and performance.



**GALION**

ESTABLISHED 1907

**GRADERS • ROLLERS**

THE GALION IRON WORKS & MFG. CO., General and Export Offices — Galion, Ohio, U. S. A.  
Cable address: GALIONIRON, Galion, Ohio

When writing advertisers please mention **ROADS AND STREETS, May, 1949**

**you name it—**

## **The new Airco 700 Welds It ...from thin metal to 2" plate**

**Why?** Because this new torch is available with a selection of tip assemblies that range all the way from Size 00 through the large No. 10 size.

This wide tip selection makes the Airco 700 suitable for your welding work — from thinnest sheet metal up to sections 2" in thickness. When equipped with a multiflame tip, this torch is tops for silver and aluminum brazing.

Each welding tip is assembled with an individual mixer drilled for that particular tip. In addition to wide operating range, other features of the "700" are: better flame control ... perfect balance ... and low maintenance cost.

With the addition of a cutting attachment, the Airco 700 can be easily converted to handle general shop cutting work.

If you would like more information about this torch, or a free demonstration right in your own shop, address Dept. S- 8468, Air Reduction, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. On West Coast: Air Reduction Pacific Company, San Francisco 4, California.



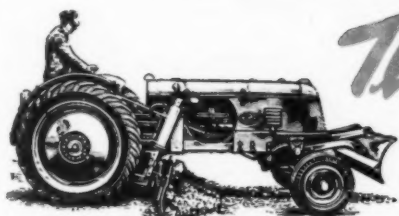
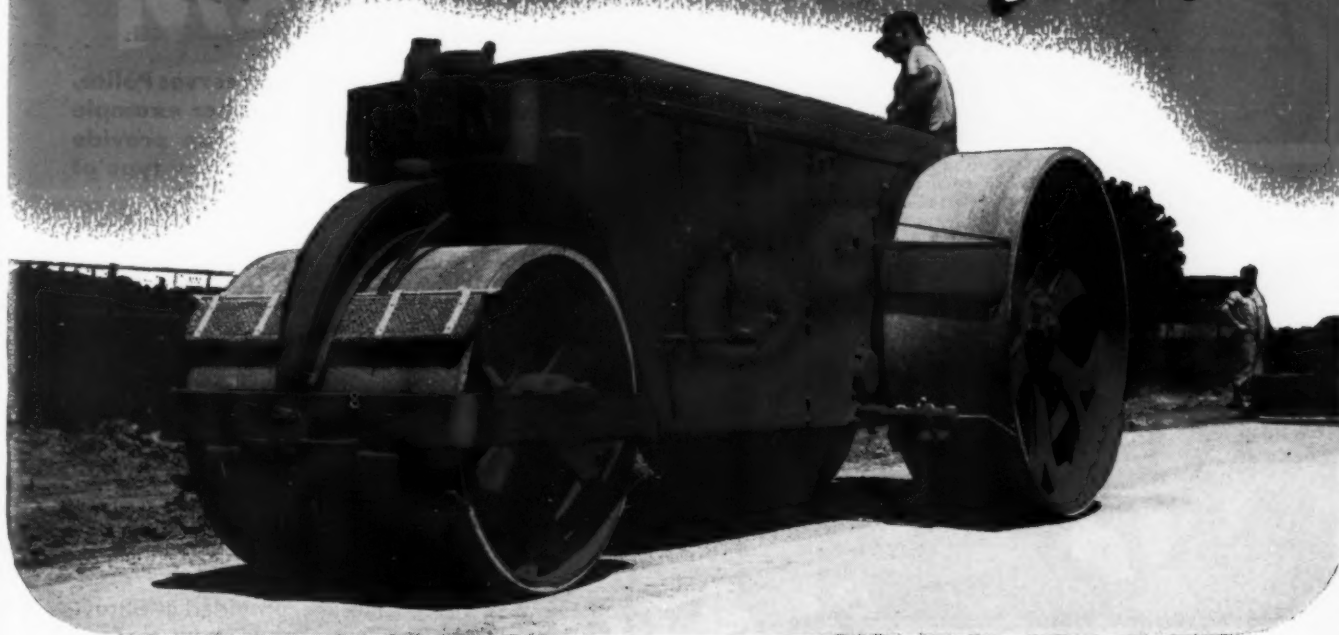
**AIR REDUCTION**

*Offices in All Principal Cities*

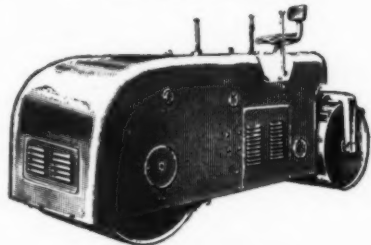
Headquarters for Oxygen, Acetylene and other Gases ... Carbide ... Gas Welding and Cutting Machines, Apparatus and Supplies ... Arc Welders, Electrodes and Accessories

**YOU'RE AFTER LOWER COMPACTING COSTS**

*Aren't You?*



**THE HUBER MAINTAINER**  
with bulldozer, patch roller, berm  
leveler, lift loader, mower, broom  
or snow plow attachments.



**HUBER TANDEM ROLLERS**  
5 Models — 3 to 14 Tons.



**THE HUBER MFG. COMPANY**  
Marion, Ohio, U.S.A.

*Then* **SEE HOW**  **3-WHEEL ROAD ROLLERS**  
**CAN SAVE YOU MONEY!**

Today, you must do a comparable job, but for a lower cost! That means you must get more out of, not only your labor, but your equipment. Experienced road men familiar with Huber equipment say you can do just that! The practical design and rugged construction of Huber 3-wheel rollers places Huber owners at an advantage where low-cost operation is a factor. Huber rollers last longer... do more work during their life span... and do it so effectively that substantial savings, both on the job and maintenance-wise are effected. Huber 3-wheel roller features that mean savings for you include: "Stay-Put" front end design, fuel economy—either gasoline or Diesel power, heavy continuous steel frame without a bend, 3 speeds forward or reverse, hydraulic controls, fast acting triple-plate clutches and easy accessibility to working parts.

Other Huber road machinery includes tandem road rollers, maintainers and trench rollers. See your Huber dealer or write for bulletins today.

**HUBER** *3 Wheel • Tandem*  
**ROAD ROLLERS**  
*and*  
**MAINTAINERS**

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# SHREVEPORT



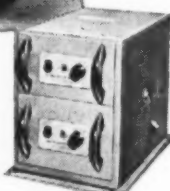
Commissioner of Public Safety A. B. "Kotton" Morris (left) and Chief of Police E. G. "Ed" Huckabay making initial call over the new Federal FM 2-way mobile radiotelephone system installed at Shreveport, La.



Fire Chief Floyd Kendrick (left) and Deputy Fire Chief H. C. Winbery make their first report through the new FM radio facilities.



Fire Alarm maintenance truck is equipped for faster service with a Federal Transmitter-Receiver unit.



A typical Federal Mobile Transmitter-Receiver Unit.

## another city goes *ALL Federal*

**New Federal Mobile FM Radio System serves Police, Fire and Water Departments . . . another example of how a complete Federal system can provide efficient communications service for every type of operation.**

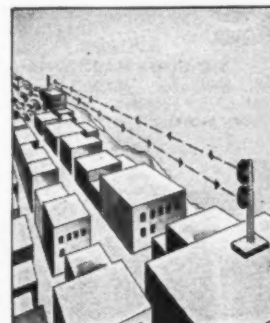
**F**ederal does it again . . . installs another comprehensive system of radio protection for an entire municipality . . . in Shreveport, La.

Federal Mobile FM Radio equipment was specified as best suited in every way to convert Shreveport's AM network to modern FM operation. The new Shreveport installation, which ranks with the finest in the country, comprises a 250-Watt Federal FM Transmitter and 40 Federal Mobile FM Transmitter-Receiver Units in fire apparatus, police cruisers, official cars, maintenance trucks and Water Department vehicles. And Federal has extended coverage to police cruisers in nearby Bossier Parish.

The same comprehensive coverage, provided at Shreveport by Federal Mobile FM Radio equipment, is available for every type of communication need—not only for municipalities but for taxi companies, bus lines, public utilities, lumber camps, pipelines and other fleet operations. For information, write to Department I-997.

**Federal's  
Complete Line of  
Communication  
Equipment  
Includes**

### MICROWAVE RADIO LINKS



Federal Microwave Radio Links may be integrated with existing or contemplated mobile radio systems to provide coordinated radio coverage of a large metropolis . . . statewide mobile radio networks . . . or to extend the range of mobile operations over the entire communication circuits of pipelines, public utilities, and other government and private services.



## Federal Telephone and Radio Corporation

100 KINGSLAND ROAD, CLIFTON, NEW JERSEY

In Canada: - Federal Electric Manufacturing Company, Ltd., Montreal, P. C.  
Export Distributors: - International Standard Electric Corp. 67 Broad St., N. Y.

# "EUCS"

## MAKE THE DIRT FLY



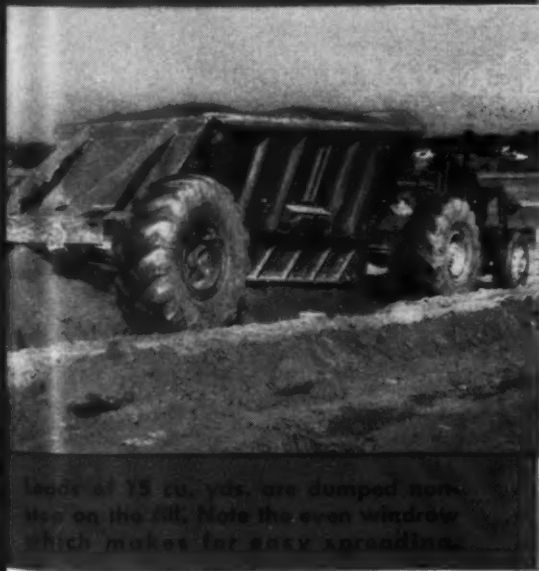
## AT ATLANTA AIRPORT!

**Y**ES, SIR! MacDougald Construction Company depends on Euclid equipment to keep Atlanta's Candler Field extension project ahead of schedule. The contract specifies that the job be completed in 240 working days.

Twenty-three Bottom-Dump Euclids working with two Euclid Loaders and six Rear-Dump Euclids loaded by 3 cu. yd. draglines are moving all of the 2,300,000 cubic yards of excavation on this project. Average hourly production of each Loader is 800 bank yards, with between 15,000 and 18,000 cubic yards overall being moved in an eight-hour day. The average haul from cut to fill is approximately 1,800 feet.

Widely used for heavy construction and mining work, Euclids provide extra power and capacity... fast travel speeds... quick, clean dumping... low maintenance costs... and efficient, long-life performance.

"Eucs" are built for dependable service that cuts your hauling costs. For information on the complete Euclid line or help with your equipment problems, see your Euclid distributor or factory branch.



The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

# EUCLIDS



*Move the Earth*



# Hystaway Hoe Front

**For use with Hystaways mounted on all "Caterpillar" D8 and current series D7 track-type tractors**



Ditch digging is fast and efficient with the new Hystaway Hoe. A narrow trenching bucket (23-in. cutting width) is available as optional equipment.

**A HIGH SPEED**, rugged NEW EARTH MOVING TOOL for ditch and trench digging and basement excavating. DOES ANY JOB that a CONVENTIONAL  $\frac{1}{2}$ -cubic yard bucket (cutting width 33 inches) CAN DO.

The Hystaway Hoe Front will dig to a full 15 ft. depth. It has MORE REACH than a conventional back hoe—an EXTREMELY FAST SWING—an actual EXCESS of POWER because of the "Caterpillar" diesel tractor engine.

The Hystaway, mounted on a "Caterpillar" D8 or D7 track-type tractor with bulldozer, now provides four tools—drag-line, clamshell, crane and the NEW BACK HOE—and full tractor mobility and maneuverability are retained.

Current delivery. See your "Caterpillar" distributor.

## HYSTER COMPANY

2995 N. E. Clackamas . . . Portland 8, Oregon  
1895 North Adams Street . . Peoria 1, Illinois



# 30,000-hour OLD-TIMER

*still  
full of  
pep!*

THIS veteran "Caterpillar" No. 9 Motor Grader refuses to retire. After eighteen years' active service with the Kearny County Highway Department, Lakin, Kansas, it still steps right along. Its standout performance led to the purchase of additional rugged "Caterpillar" Diesel Motor Graders — and today there are five in the county's setup.

They're all pictured here working together to raise a road 14" with a 24' top. The new No. 12 cuts the first ditch . . . the veteran spreads that ridge . . . the next No. 12 cuts another ditch . . . the No. 212 spreads that ridge . . . and the No. 112 fills the ditch. Average time, including pushing weeds, 2½ hours per mile of finished road.

All year round you can rely on husky "Caterpillar" Diesel Motor Graders for dependable, money-saving performance. They're so sturdy they can handle tough jobs without flinching — so accurate you can hold a grade within a quarter of an inch. Ask your "Caterpillar" dealer about their economical, efficient operation on state and county jobs all over the country. He's nearby to help you, whether it's with information or prompt, competent service.

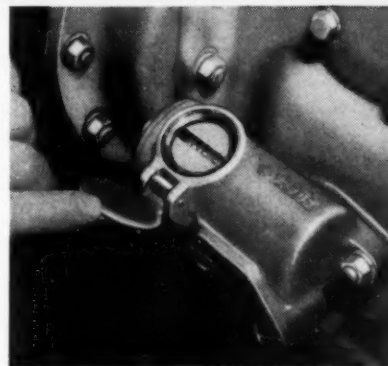
CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS



Using its 30,000-hour veteran "Caterpillar" No. 9 Motor Grader and four younger graders of the same make, the Kearny County Highway Department, Lakin, Kansas, gets this road ready for winter.



No guesswork here! The Hour Meter on all "Caterpillar" Diesel Engines logs their time in operation. "Caterpillar" was first to keep accurate, dependable records of engine performance.



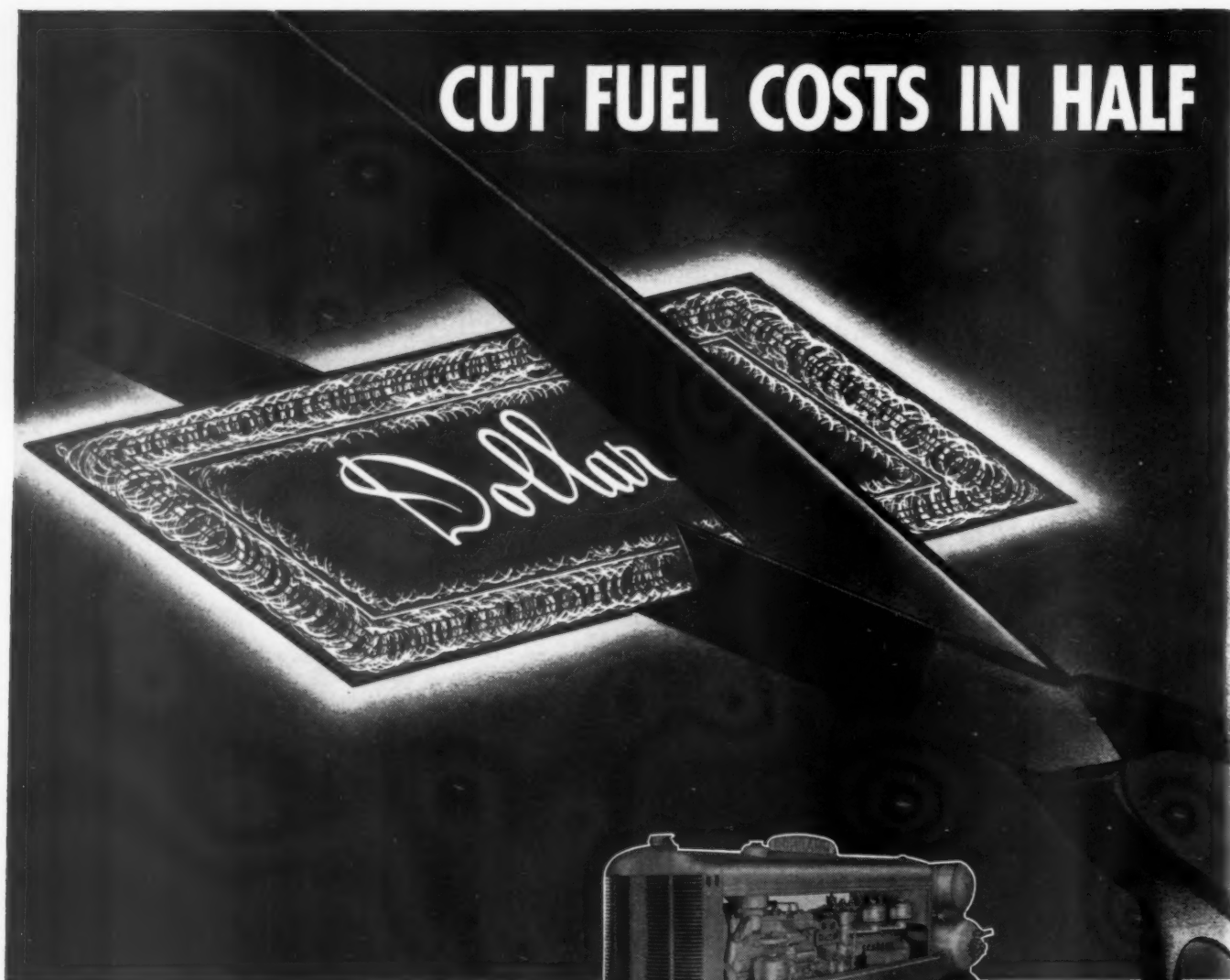
## CATERPILLAR

REG. U. S. PAT. OFF.

## DIESEL

ENGINES • TRACTORS • MOTOR GRADERS  
EARTHMOVING EQUIPMENT

# CUT FUEL COSTS IN HALF



## with the **SCHRAMM** *Pneumastat*

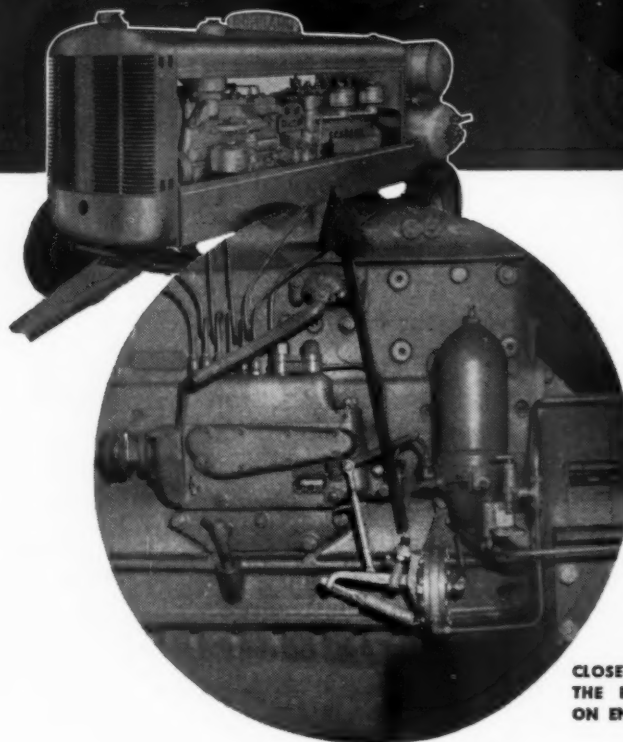
YES, this saving is now possible with the new feature of the Schramm Air Compressor . . . the Pneumastat!

The Pneumastat assures you of *infinitely variable speed* and the elimination of continuous loading and unloading. The result is an *even flow of air* regardless of how variable the compressor load might be!

Other advantages offered by the Pneumastat are:

- ✓ Higher average working pressure—more work from your tools.
- ✓ Simple and rugged . . . no valves, no checks, no pistons.
- ✓ Longer compressor and engine life.
- ✓ Lower maintenance costs.
- ✓ Requires no service or adjustment.

COMPLETE DETAILS ON REQUEST, WRITE DEPT. AOW.



CLOSE-UP VIEW OF  
THE PNEUMASTAT  
ON ENGINE BLOCK

# SCHRAMM INC.

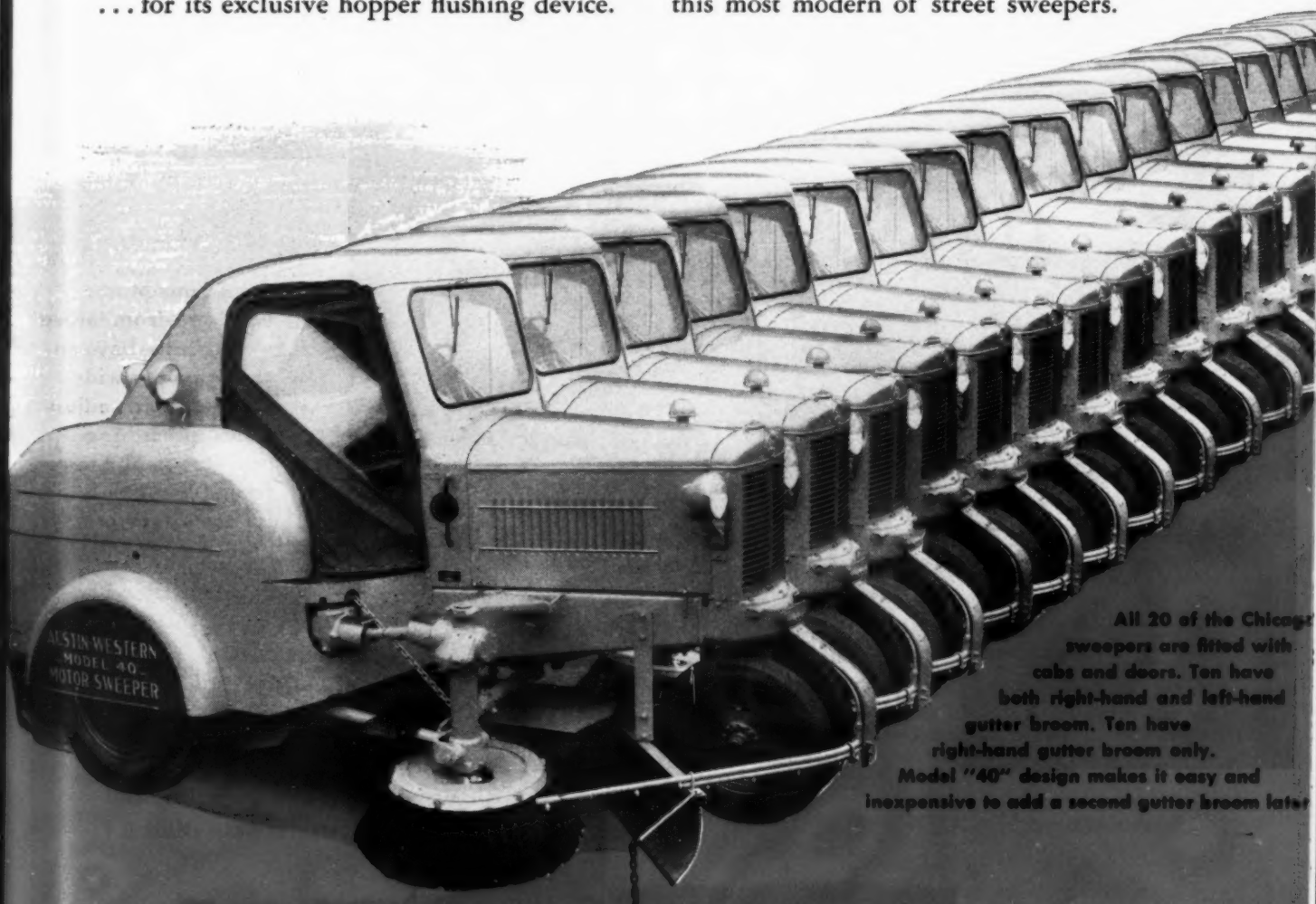
THE COMPRESSOR PEOPLE • WEST CHESTER • PENNSYLVANIA

# 20 for Chicago

The parade is on! City after city chooses the Model "40" Sweeper. Chooses it for its exclusive three-wheeled design with front steer and rear dump . . . for its NO CONVEYOR feature with patented deflector bar . . . for its 36" bump proof oscillating gutter broom . . . for its exclusive hopper flushing device.

Sweeping width is 7' with one gutter broom (right-hand or left-hand); 9' with two gutter brooms. A Leaf Broom attachment solves the leaf problem.

Your nearby Austin-Western distributor will be glad to tell you the whole story of this most modern of street sweepers.



All 20 of the Chicago sweepers are fitted with cabs and doors. Ten have both right-hand and left-hand gutter broom. Ten have right-hand gutter broom only. Model "40" design makes it easy and inexpensive to add a second gutter broom later.

**AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS**

BUILDERS OF ROAD MACHINERY  
**Austin Western**  
 SINCE 1889



# Plenty of Range - 7



All Adams Motor Graders—from largest to smallest—have an exceptionally wide range of blade adjustments, permitting operator to obtain proper blade positions for every type of grader work.



# 2 - Ample Operating Clearances



Along with a wide range of blade adjustments—with ample operating clearances in all positions—Adams Motor Graders also provide generous clearances for maneuvering the blade into any desired position, quickly, easily, as illustrated above:

① **Between Blade Ends and Tires:** Lots of room here for sharp blade angles—without tire interference, front or rear.

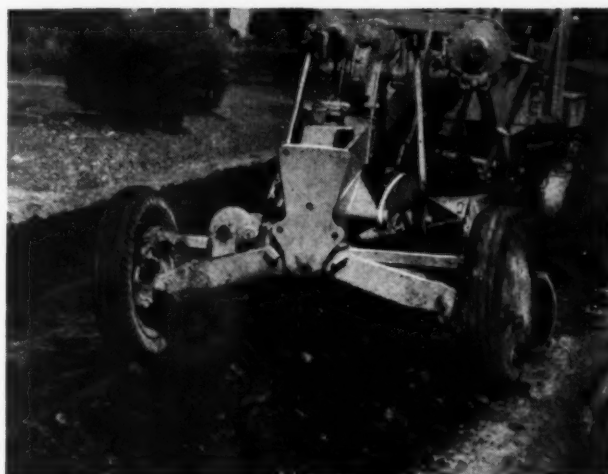
② **Between Blade and Frame:** Plenty of space provided for free movement of the blade heel.

③ **Between Blade Assembly and Frame Arch:** More space for higher lift of the blade and better ground clearances.

④ **Between Blade and Scarifier Block:** Ample room for easy reversing of blade under scarifier block.

This is but a sample of the thoughtful engineering that goes into Adams Motor Graders—engineering that gives you the fastest, most efficient and economical grader operation you've ever known. Let your local Adams dealer give you complete details.

J. D. ADAMS MANUFACTURING COMPANY • INDIANAPOLIS, INDIANA

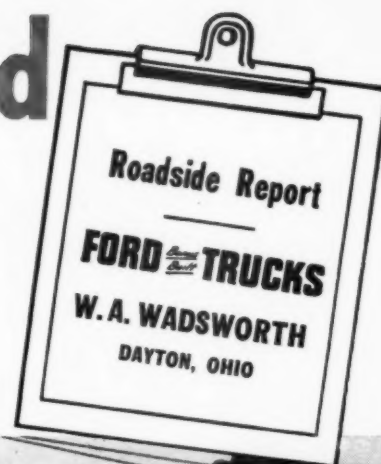


Adams high-arch front axle provides approximately twice the capacity of conventional axles for straddling large windrows of material. Bulldozing of axle through material is eliminated—no waste of power, no loss of operating speed.

*Make your next  
motor grader an*

# Adams

# "Our FORD F-8 pulled a 25-ton shovel up 4<sup>th</sup> St. Hill!"



"RECENTLY we had occasion to place our 25-ton shovel at the top of East 4th Street Hill in Dayton," reports W. A. Wadsworth, General Manager of Southern Hills Pit, Inc. "We did this with our Ford F-8 Big Job without the assistance of a second truck and had a comfortable reserve of power. To our knowledge, no other make of truck has pulled the hill our F-8 did, with a similar load."

Owners and drivers sing the praises of the new Ford Big Jobs. Owners like Big Job extra power and low cost operation. They claim the new 145-horsepower engine outsaves engines much smaller in size. Drivers are enthusiastic about the ease and comfort of the Million Dollar Cab and its Ford Level Action suspension. Both are impressed by Ford Bonus Built construction, characteristic of 139-plus models in a full truck line. Bonus Built is the superstrong construction that contributes to long truck life.



**BUILT STRONGER TO LAST LONGER**

USING REGISTRATION DATA ON 5,444,000 TRUCKS,  
LIFE INSURANCE EXPERTS PROVE FORD TRUCKS LAST LONGER!

## ONLY THE FORD BIG JOB

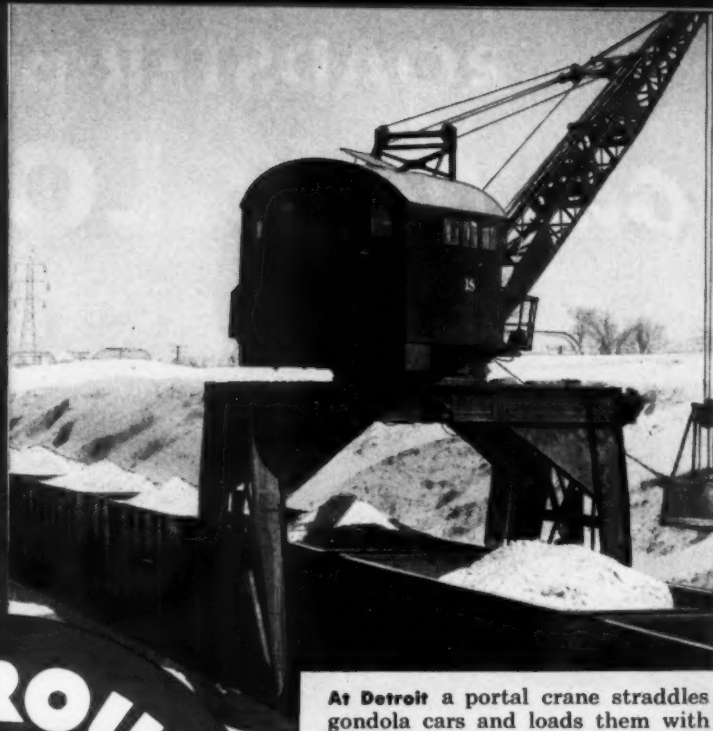
HAS ALL THESE FEATURES!

- ★ New 145-h.p. Ford V-8 engine for top performance.
- ★ Ford exclusive concentric dual-throat carburetor for more power, more economy.
- ★ New heavy duty 5-speed transmissions for operating flexibility.
- ★ Big Ford power-operated brakes for sure-footed stopping; rear 16-inch by 5-inch on the F-8.
- ★ Ford Super Quadrax 2-speed axle with vacuum shift for performance flexibility in Model F-8 (single speed axle also available); single-speed Quadrax Hypoid Axle in Model F-7.
- ★ Large diameter (10-inch) wheel bolt circle with 8 studs to allow for extra-strong hub construction.
- ★ Million Dollar Cab with Ford Level Action suspension for greater driving comfort.
- ★ Nationwide service from over 6,400 Ford Dealers.
- ★ Ford Bonus Built construction for long truck life.

Gross Vehicle Weight Ratings: F-8 up to 21,500 lbs., F-7 up to 19,000 lbs. Gross combination ratings: F-8 up to 39,000 lbs., F-7 up to 35,000 lbs.



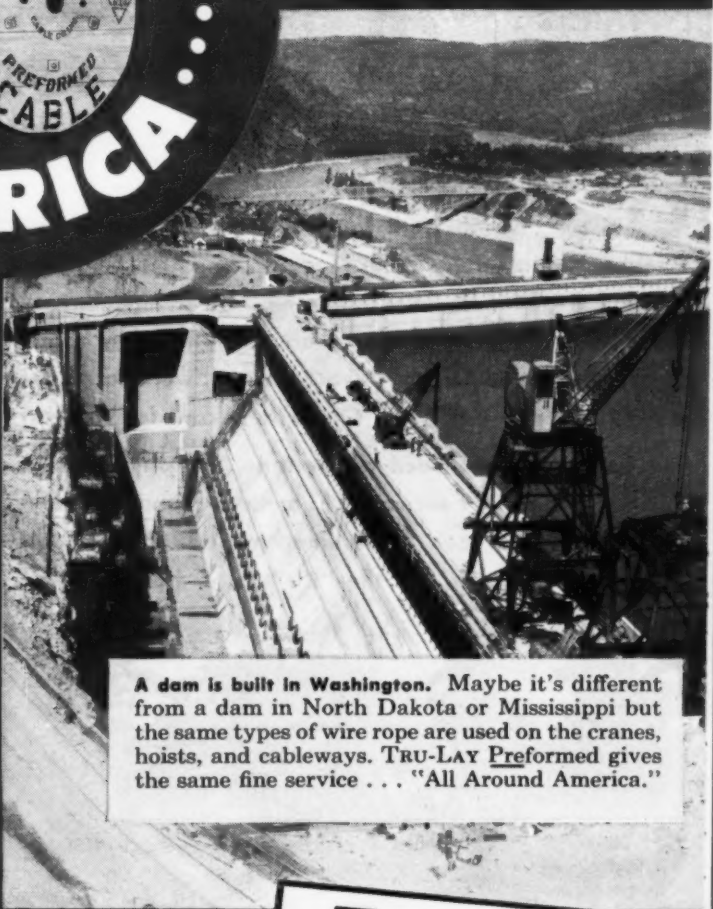
In Southern Illinois strip mining is big business. The shovels and draglines that remove overburden are big, too. **TRU-LAY** Preformed in large sizes has excellent qualities that make it a favorite for strip mining.



At Detroit a portal crane straddles gondola cars and loads them with foundry sand from storage piles. **TRU-LAY** Preformed is made in a construction designed for longer service under such abrasive conditions.



Out in Idaho, too, there are mountains of earth to be moved. Rooters, bulldozers, carrier scrapers, draglines and wagons are used. **TRU-LAY** Preformed Flattened Strand lasts longer under this gruelling service. It costs less to use.



A dam is built in Washington. Maybe it's different from a dam in North Dakota or Mississippi but the same types of wire rope are used on the cranes, hoists, and cableways. **TRU-LAY** Preformed gives the same fine service . . . "All Around America."



Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Seattle, Tacoma, Bridgeport, Conn.

**AMERICAN CABLE DIVISION  
AMERICAN CHAIN & CABLE**

*In Business for Your Safety*

**Tru-Lay**  
*Preformed*  
**Wire Rope**

# "D" ROADSTER produces more than *on both* LONG HAULS.



ROADSTER

**36**  
YARDS

CRAWLER

**18**  
YARDS

PAY YARDS PER HOUR

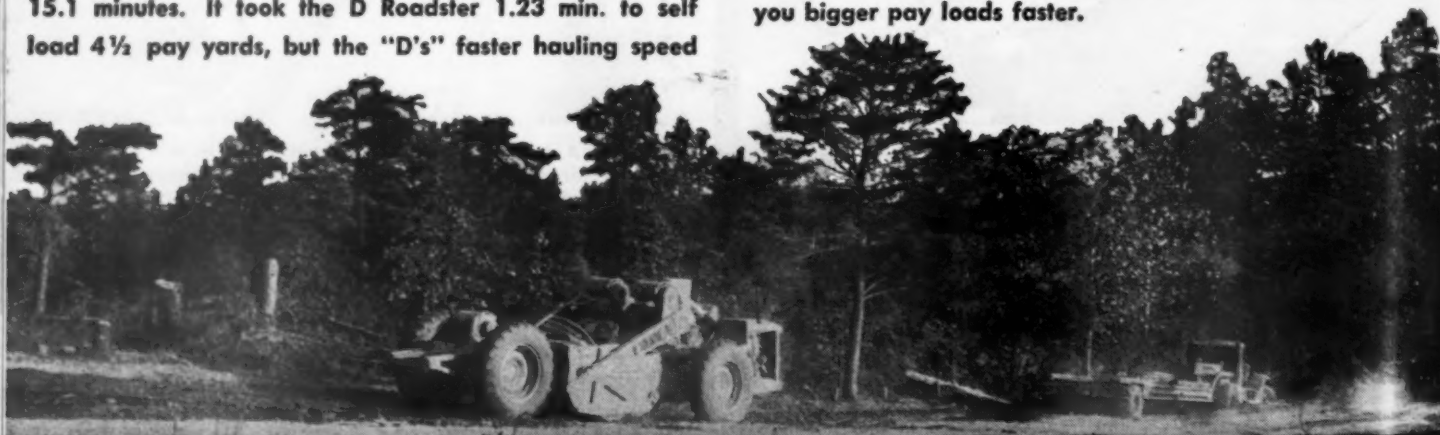
*... Doubled yardage output*  
**OF 100 H.P. CRAWLER AND 8-YARD  
SCRAPER ON 2350' 1-WAY HAUL**

**O**N cut and fill work for secondary road near Tus-  
cumbia, Alabama, a rubber-tired, 25 m.p.h. D Roadster  
recently proved itself more than a high-speed maintenance  
tool. The 100 h.p., 7-yard rig produced twice the yardage  
of a 100 h.p. crawler and 8-yard scraper, working on the  
same 2350' one-way haul. Check the record for yourself:

The crawler outfit loaded an average  $5\frac{1}{2}$  pay yards of  
common earth in 39 seconds . . . made a round trip every  
15.1 minutes. It took the D Roadster 1.23 min. to self  
load  $4\frac{1}{2}$  pay yards, but the "D's" faster hauling speed

cut overall cycle time to 6.3 min. . . enabled it to chalk  
up 8 trips per hour to the crawler's 3.3. That's 18.15  
pay yards hourly output with the crawler-scraper . .  
36 pay yards for the higher-speed "D".

That's why this one-man Roadster gets so much work done  
on maintenance-type dirtmoving . . . and is a yardage  
booster on production jobs. Remember, too, it's extremely  
profitable in fleet operation, where use of a pusher gives  
you bigger pay loads faster.



**See your Le Tourneau Distributor  
NOW for complete information**

# an crawler-scraper combinations S... and SHORT HAULS



ROADSTER

**80**

YARDS

CRAWLER

**74**

YARDS

PAY YARDS PER HOUR

*... Moved 9 per cent more*  
**THAN 93 H.P. CRAWLER AND 10-YARD  
SCRAPER ON 425' 1-WAY HAUL**

**O**N another Alabama county road job, near Heflin, the high-speed D Roadster outperformed a 93 h.p. crawler and 10-yd. scraper . . . this time, on a short haul of 425' one way . . . and in tough, rocky clay. Material had 25% voids and was ripped before loading. The bigger-capacity crawler combination loaded 6½ pay yards . . . averaged 11.4 loads . . . 74.1 pay yards per hour. The smaller, but faster, rubber-tired "D" self-loaded 4 pay yards . . . made 20 trips to the crawler's 11.4 . . . averaged 80 pay yards an hour, an increase of 9%!

Yes, even on short hauls like this, as well as on the longer hauls, today's rubber-tired, 25 m.p.h. "D" is proving Tournapull's reputation for more yards per hour at lowest net cost per yard.

You also get all the added advantages of modern, finger-tip electric controls . . . positive power steer . . . power-proportioning differential, which help keep hourly

yardage high . . . *plus* 25 m.p.h. roadability for fast, self-powered moves from job to job.

Get all the facts on what this 7-yard D Roadster can do for you. Mail coupon **TODAY!** Talk with any owner . . . or ask your LeTourneau Distributor to give you the full story on D Roadster performance, price and delivery.

**To: R. G. LeTOURNEAU, Inc., Peoria, Illinois**

Please send D Roadster facts: ☐ Specs ☐ Price ☐ Deliv  
☐ Would like analysis on my present job.

NAME.....TITLE.....

COMPANY.....

TYPE OF BUSINESS.....

STREET.....

CITY.....

STATE.....

Tournapull—Trademark Reg. U.S. Pat. Off. R144

**LETOURNEAU**  
PEORIA, ILLINOIS



**TOURNAPULLS**

**MORE WORK PER HOUR WITH RUBBER-TIRED POWER**

# Bitumuls

REG. U. S. PAT. OFF.

has pioneered  
MANY PRODUCTS

## 2. Sand Mix

with Bitumuls  
Emulsified Asphalt



"One-man" pavement construction in California with modern mixers. Note Bitumuls non-stop "refueling" from transport.



An Aleutian transport lands during runway construction. Bitumuls Sand-Mix although only partially cured — supports heavy loads.

## LOW COST PAVEMENTS from Native Material

### Here was an Army Assignment:

"Build 6 big Airports in the Aleutians — in cold, wet weather — and fast. No access roads, and sound aggregate not available."

**BITUMULS** was the answer. It mixed easily with the wet existing sand, and cured in record time — Vital factors in repulsing Jap bombers.

### Here was a Navy Assignment:

"Pave 1,700,000 sq. yds. of parking area for carrier planes. No local crushed aggregate available. The cost must be low."

**BITUMULS** was again the answer. Nine Million Gallons stabilized 350 Acres of local sand—6" Deep. Conventional pavement would have required over 600 trainloads of imported aggregate—at about three times the cost.

State and County Highway Engineers in the "Sandy" South appreciate the stability and low cost of **BITUMULS SAND MIX PAVEMENT**. In the U. S., there are over 25 million sq. yds. of this type of pavement in use. More is being constructed every year—the reasons:

- |                                 |                            |
|---------------------------------|----------------------------|
| 1—Very Low Cost                 | 3—Ease of Construction     |
| 2—Use of Existing Road Material | 4—Trouble-Free Maintenance |

## Buy Bitumuls & Build Better Pavements

*In the West*

### STANCAL ASPHALT & BITUMULS COMPANY

200 BUSH STREET • SAN FRANCISCO 4, CALIF.

Los Angeles 14, Calif. • Oakland 1, Calif. • Portland 4, Ore. • Tucson, Ariz.

*In the East*

### AMERICAN BITUMULS COMPANY

200 BUSH STREET • SAN FRANCISCO 4, CALIF.

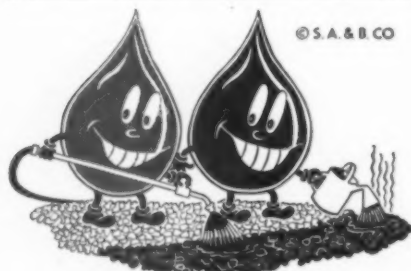
Washington 6, D. C. • Baltimore 26, Md. • Perth Amboy, N. J.

Columbus 15, O. • St. Louis 17, Mo. • Baton Rouge 2, La.

E. Providence 14, R. I. • San Juan 23, Puerto Rico

Ask for our **BITUMULS BOOKLETS**. They are factual, illustrated, and helpful — a valuable addition to your engineering library.

- |  |                          |
|--|--------------------------|
| Bitumuls Penetration Macadam . . . . .     | <input type="checkbox"/> |
| Bitumuls for Maintenance . . . . .         | <input type="checkbox"/> |
| Bitumuls Sand-Mix . . . . .                | <input type="checkbox"/> |
| Bitumuls Handbook . . . . .                | <input type="checkbox"/> |
| Hydropel—Admix for concrete . . . . .      | <input type="checkbox"/> |
| Tennis Courts—Laykold & Grsstex . . . . .  | <input type="checkbox"/> |
| Fibrecoat—roof and metal coating . . . . . | <input type="checkbox"/> |



The ASPHALT Twins

© S. A. & B. CO

**SPEED UP YOUR JOBS...  
MEET YOUR SCHEDULES...  
CUT DOWN YOUR COSTS...**  
with

# Firestone

## OFF-THE-HIGHWAY TIRES



**P**ROFIT is the difference between making time and marking time . . . between going through and going down. You can throttle your downtime, accelerate your production time, and increase your profits with Firestone Tires.

If you need a tire with plenty of reserve pulling power for even the softest going, the Firestone Ground Grip will fill the bill—and it will give you the extra tread life and the extra body life that make your tire dollars go further.

And where you need maximum traction for rock work, strip mining, and other severe operations, get the tire with the toughest, most aggressive tread ever built—Firestone Rock Grip. It will be on the job after other tires are on the scrap pile.

The Firestone Earth Mover is the tire for free-rolling wheels that must move heaping loads over sand and soft earth. It provides maximum flotation and maximum life at minimum cost.

*Listen to the Voice of Firestone every Monday evening over NBC and Americana over NBC Network Television Stations*

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**EARTH MOVER    GROUND GRIP    ROCK GRIP**

**When you buy Replacement Tires  
or when you buy New Equipment specify —**

# Firestone

**OFF-THE-HIGHWAY TIRES**

# PUSH- PULL for POWER PLUS Bucket-Loads



Hydraulically controlled bucket is shown above at load start position. Double action cylinders are placed in power plus horizontal thrust position. Note powerful triangular construction.



Hydraulic Bucket control permits slow or fast dumping. Loaded bucket can be leveled throughout lifting operation. Start of controlled dump is shown in illustration above.

## THE OTTAWA DOUBLE ACTION INDUSTRIAL LOADER

Dual Hydraulic operation throughout. The bucket is hydraulically controlled by a powerful pair of double action cylinders. This feature adds many operational uses never before found in loaders of its price range.

High capacity double action lift cylinders make the Ottawa "Double Action" outstanding in the loader field. Down pressure on lifting cylinders adds excavating to the long list of material handling operations possible with the New Ottawa. Here is a loader that lifts, loads, digs and builds stock piles as well as functioning as a material leveler and spreader.

*Now available for following tractors:*

Minneapolis Moline RTI—UTI—UTIL

International Harvester I-4—I-6—ID6—I-9—ID9

Case SI—DI—LAI

It's new—It's a feature your customers have been looking for—It's low cost—

It's economical — Write today for complete details and price list.

**Ottawa**

**STEEL PRODUCTS, Inc.**  
INDUSTRIAL DIVISION  
OTTAWA, KANSAS • U. S. A.





# Announcing McCULLOCH 1-man 2-man CHAIN SAWS

**HERE'S THE FIRST REAL ANSWER** for high-speed, economical land clearing and timber bucking or felling. The McCulloch is a husky wood-cutting wizard, with many new features to speed timber work in construction, railroad, and tree-maintenance operations.

All-purpose Rip-Cross chain is easily sharpened by hand filing in the field. Its curved cutting teeth never need setting.

360° swivel permits close felling and underbucking. In addition, the engine will operate in any position, because of its McCulloch floatless carburetor.

Automatic clutch stops the chain when the engine is idling. This safety feature also prevents the engine from stalling in a timberbind.

The handle detaches instantly, for one-man use or to permit pulling the blade through a cut.

Correct chain tension is automatically adjusted.

Many other features—*kickproof* recoil starter, solid, tool-steel blade and conveniently grouped engine controls—save time and effort on the job.

FULL 5 HP FOR TIMBER  
UP TO 5 FEET ★

WEIGHS ONLY 49 LBS.  
COMPLETE WITH 20" BLADE  
AND CHAIN ★

CHOICE OF BLADES IN 20, 30,  
40, 50 AND 60 INCH LENGTHS ★

## PRICES

20-inch chain saw...\$385.00

30-inch chain saw...\$395.00

40-inch chain saw...\$405.00

50-inch chain saw...\$415.00

60-inch chain saw...\$425.00

20-inch bow saw...\$425.00

Prices f. o. b. Los Angeles

## McCULLOCH MOTORS CORPORATION

6101 W. Century Blvd.  
Los Angeles 45, Calif.  
Dept. M.S.

*Fast-cutting, light-weight  
McCulloch chain saw simplifies  
cutting even more in hilly terrain.*



SEND FOR FULL INFORMATION

McCULLOCH MOTORS CORPORATION

6101 W. Century Blvd.

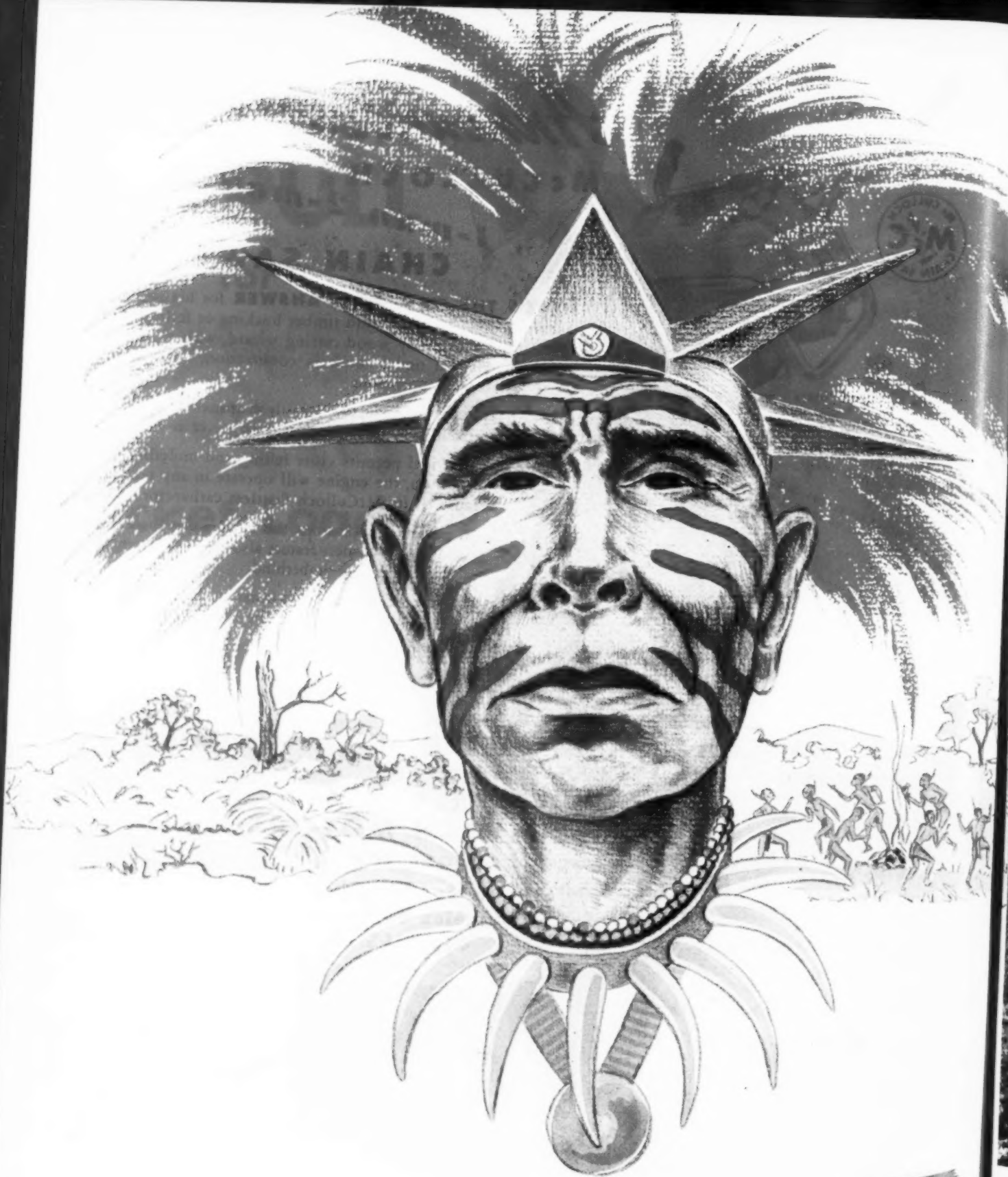
Los Angeles 45, Calif. Dept. M.S.

Please send complete information on the 5-hp. McCulloch chain saw.

Name \_\_\_\_\_

Firm name \_\_\_\_\_ Type of work \_\_\_\_\_

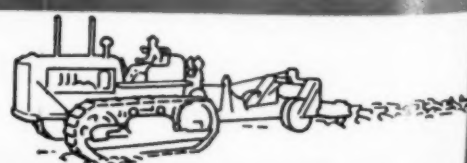
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_



*Listen to James Melton and "Harvest of Stars" every Sunday, NBC.*

**Standardize  
on Power  
that Pays**

**CRAWLER TRACTORS • WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS**



Just  
Inter  
sheet  
guard  
horse  
addit  
den o

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fuel f

INTERN  
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# GOOD MEDICINE

Just what the doctor ordered . . . *red-painted* International Diesel Crawlers keep balance sheets healthy by boosting production and guarding costs. They deliver their full-rated horsepower on every job, yet hold in reserve additional lugging ability for handling sudden overloads that would otherwise kill.

Their starting and combustion systems, fuel feed, speed governing, torque control,

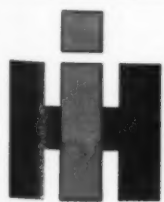
lubricating methods and overall rugged construction account for their superior performance and long-lived stamina.

Since reliable, economical power is "good medicine" for any power-using business, it will pay you to contact your International Industrial Power Distributor. Get International Diesels on your jobs now.

**INTERNATIONAL HARVESTER COMPANY, Chicago**

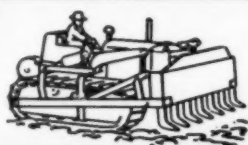


An International TD-18 Diesel Crawler fills its 8-yard scraper quickly on this tough, deep-sand road job. Latest model, with increased drawbar horsepower and many improvements, is now available.



INTERNATIONAL  
HARVESTER

## INTERNATIONAL INDUSTRIAL POWER





## COLORED CONCRETE TRUCK LANE

### Ends Traffic Bottlenecks on Hills

ON TWO-LANE highways in rolling terrain slow-moving trucks and busses often back up traffic and cause serious bottlenecks that greatly reduce the capacity of the highway—as much as one-third where 20 per cent of the traffic is commercial vehicles. Moreover, these irritating delays at times lead to accidents when impatient drivers try to pass on the hills.

Two-lane highways can handle larger volumes of traffic *with safety* when a third, colored, lane is added on upgrades. That is what Tennessee highway engineers did in 1940 when relocating a two-mile section of U. S. 31W north of Nashville. They colored this extra lane red to channelize slow-moving vehicles, leaving the two regular lanes free for faster cars.

"The use of these colored third lanes on grades has been so successful in reducing congestion and accidents on hills," reports William Rees, Engineer of Surveys and Design, Tennessee State Highway Department, "that we are now planning several other similar installations. Including sections now being planned, this will give Tennessee 10 miles of this modern, safety-designed, colored third lane on hills."

The colored third lane is obtained at small additional cost by building the top 2-in. course of the pavement with colored concrete.

Other states have found that colored lanes enlarge the capacity and increase the safety of roads when used on upgrades or as acceleration or deceleration lanes on expressways. A bulletin on colored concrete pavement is available free. Write for your copy today. Distributed only in the United States and Canada.

Photo of U. S. 31W near Nashville shows passenger cars passing slow-moving traffic on colored lane. All lanes are 11 ft. wide and 8"-6"-8" in cross section.

## PORTLAND CEMENT ASSOCIATION

Dept. A5-28, 33 W. Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

# Here's the answer

## to high-speed, low-cost spreading of dry, harsh concrete



### THE BLAW-KNOX CONCRETE PAVING SPREADER *with the Automatic Transverse Blade*

#### EXCLUSIVE FEATURES

Automatic spreading regardless of where concrete is placed on the subgrade.

Action of transverse spreading blade clears path for forward movement of spreader machine.

Will not disturb joints or reinforcing.

Paving vibrator driven by same engine and transmission that operate spreaders.

Paving vibrator does not rest on side forms.

One-man operation for spreading and vibrating.

NO matter where the concrete is dumped on the subgrade, the forward motion of the Blaw-Knox Concrete Paving Spreader and the transverse motion of the spreader blade spreads it uniformly to the width and elevation required. There's no segregating effect on the concrete regardless of its dryness or the size of the aggregates. The automatic reversing action of the spreader blade relieves lateral pressure so alignment of paving forms is never disturbed. The Blaw-Knox Spreader has plenty of capacity to keep up with two 34-E DuoMix Pavers.

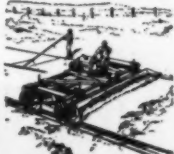
A Blaw-Knox Vibratory attachment may be added to compact concrete simultaneously with the spreading operation to increase the density and strength of the concrete.

Blaw-Knox Spreaders are available in two standard adjustable widths—10' to 15' and 20' to 25'. Narrow machines can be converted to wide machines and vice versa. For the whole story on low-cost paving, ask your nearest Blaw-Knox distributor about his complete line of concrete paving equipment.

AGGREGATE PLANTS



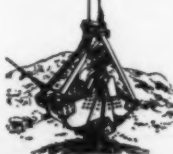
FINISHING MACHINES



BULK CEMENT PLANTS



CLAMSHELL BUCKETS



ROAD FORMS



SUBGRADERS

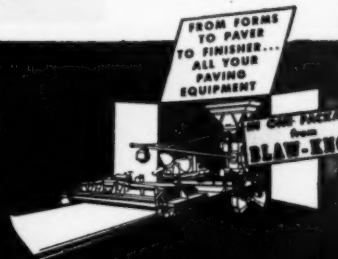


#### ALSO

Concrete Pavers  
Adnun Black Top  
Pavers  
Kinetic Mixers  
Concrete Buckets  
Steel Street Forms  
Truck Mixers  
Ready Mixed Concrete  
Plants, Etc.

# BLAW-KNOX

BLAW-KNOX DIVISION OF BLAW-KNOX CO., Farmers Bank Bldg., Pittsburgh 22, Pa.  
New York • Chicago • Philadelphia • Birmingham • Washington





# Rock-Crushing POWER

AT ROCK-BOTTOM COST

*Ada County's Universal No. 880 Master gravel plant with 24" twin dual roll crusher and No. 1024 jaw crusher, powered with a 6-71 GM Diesel engine.*

Here's a rock-crushing plant that produces up to 200 three-yard truck loads a day using only 45 gallons of fuel in 8 hours. It's owned by Ada County, Idaho, and it is powered with a 6-cylinder General Motors Series 71 Diesel.

In applications like this, all over the country, these rugged 2-cycle GM Diesels are getting more work done—and getting it done for less cost. With power at every downstroke, they deliver a sturdy, dependable flow of power. They're smooth, easy to start and quick to adjust to varying load demands.

As for upkeep—it is always low because of the clean, simple design and precision manufacture found in GM Diesel engines. They are built to "take it" on tough jobs like this—are given rigid "run-in" tests. Then too, they are backed by Detroit Diesel's well-known owner service policy and the ready availability of factory engineered replacement parts.

All this makes a GM Diesel a natural for any job you may have. It's an engine you'll want to learn about, so write today for the complete story.

## DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES...Up to 200 H.P. DETROIT 28, MICHIGAN MULTIPLE UNITS...Up to 800 H.P.

GENERAL MOTORS

**DIESEL BRAWN WITHOUT THE BULK**



# More Highway Miles for Your Dollars

...WITH **P&H** SINGLE PASS SOIL STABILIZERS

*Proved on country-wide road building jobs, P&H Soil Stabilizers provide lower cost construction of excellent all-weather roads, highways and airstrips — making its need especially great in this period of pinched budgets.*



Everywhere the P&H Soil Stabilizer has gone to work — East and West, North and South, and foreign countries as well — this remarkable machine has won praise for its surprising efficiency, adaptability and performance.

Contractors and highway departments find in it the long-sought answer to lower-cost roads — one machine, making maximum use of native materials, performs *all* stabilizing operations to meet exact specifications for roads of *pre-determined* load carrying capacity.

Capable of both soil-cement and soil-bituminous stabilization, the P&H Stabilizer with one operator and in one pass fulfills the eight basic requirements of soil stabilization: depth control, digging and pulverizing, blending, maintenance of true sub-grade, accurate introduction of liquids, final mix-

ing and uniform spreading . . . and at a rapid rate of speed.

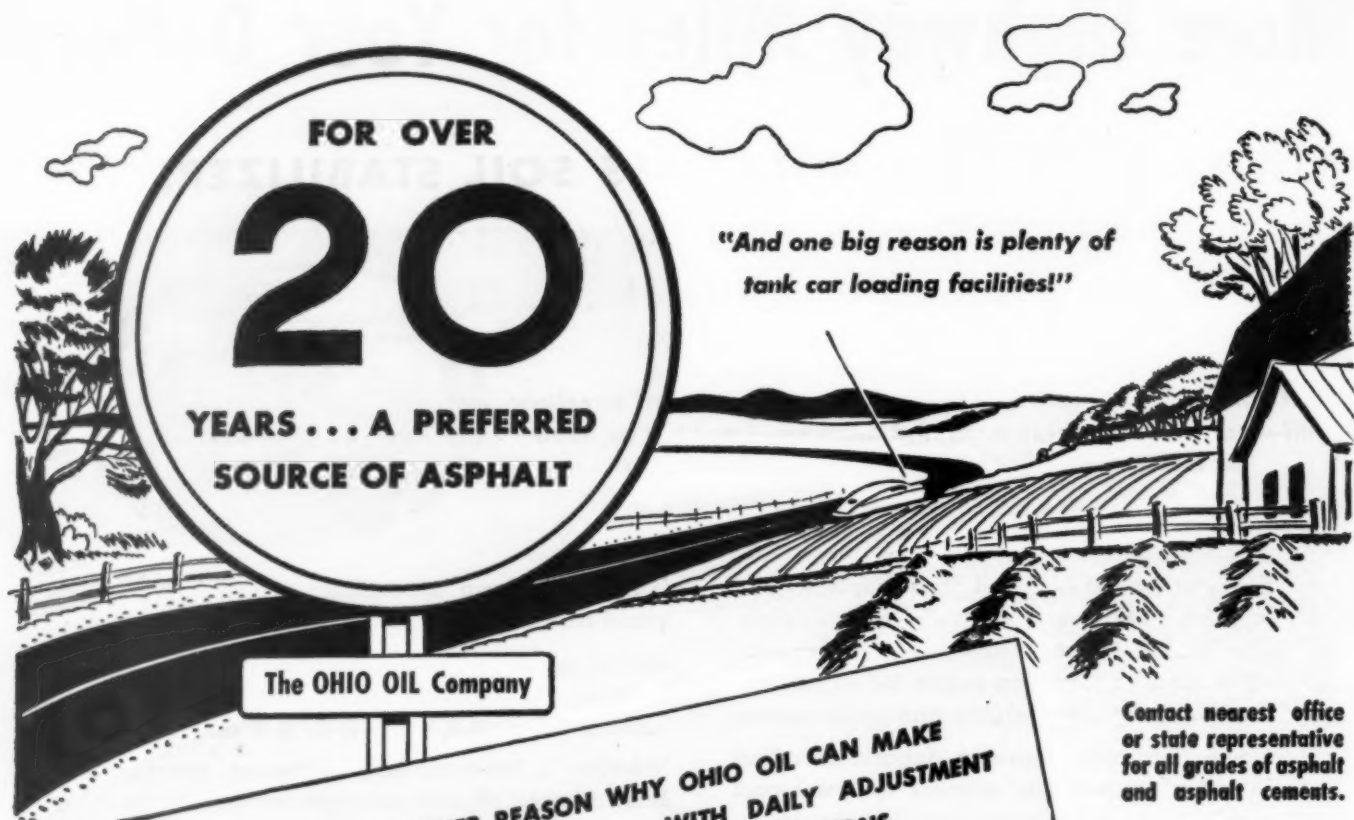
Moreover, the P&H Soil Stabilizer is adaptable for use in all six of these soil classifications: A-1, A-2, A-3, A-4, A-6 and A-7.

Whether it be secondary highways, streets, base courses, airport runways, parking strips, by all means investigate the P&H Single Pass Soil Stabilizer. Write, today, for the facts.

*Sound color films showing P&H Stabilizer on all types of soil-cement and soil-bituminous jobs are available. Write for a showing!*



Typical soil-bituminous road construction by a P&H Stabilizer. Over a mile of road per day is not unusual — with less equipment, less supervision.



**CHECK OFF ANOTHER REASON WHY OHIO OIL CAN MAKE FLEXIBLE, ON-TIME DELIVERIES . . . WITH DAILY ADJUSTMENT OF SCHEDULE TO MEET LOCAL JOB CONDITIONS**

✓ The tank car for your asphalt shipment doesn't sit on a siding at Ohio Oil, waiting its turn at the loading rack. Ample loading and switching facilities (increased for 1949) start your shipment moving without delay.

**AMPLE REFINERY CAPACITY!** One of the major producers of asphalts for over 20 years. Greatly increased production in 1949 as result of expansion program.

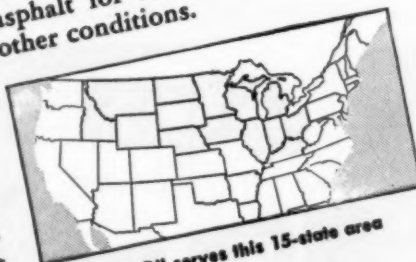
**AMPLE CRUDE SUPPLY.** (Ohio Oil owns and produces all of its own crude—assuring first choice of best asphaltic crudes.)

**AMPLE STORAGE FACILITIES** for all types and grades of asphalt (increased for '49) to insure immediate shipments and to meet peak demands.

**LARGE RESERVE OF TANK CARS** in all sizes.

**ONE COMPANY CONTROL.** All operations under direct refinery control of The Ohio Oil Company.

**TOP ENGINEERING SERVICE, TOO.** You get reliable recommendations, based on exhaustive field and laboratory studies, to make sure you get the right type of asphalt for local aggregate and other conditions.



Ohio Oil serves this 15-state area

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**Asphalt Department**

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Producers of Petroleum since 1887



Contact nearest office or state representative for all grades of asphalt and asphalt cements.

# Barber-Greene

B-G COST SAVING BULLETIN No. 4902

## CONTRACTOR LOADS 80,000 YARDS PER YEAR WITH ONE BUCKET LOADER



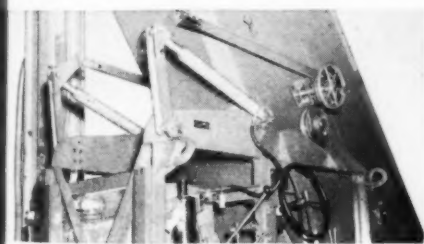
847331

### Reports Loading Cost of 1/2 Cent per Yard

Ashland, Mass. — Backed by years of experience with all types of truck-loading equipment, and close cost accounting on each type, the Ashland Sand and Gravel Company, Inc. reports that the record for lowest cost and fastest truck loading goes to its B-G 545-A Bucket Loader.

In loading approximately 80,000 yards of material yearly—sand, stone, loam, etc., the B-G Loader brought costs down to one-half cent per yard, including depreciation and maintenance as well as operating expense. This low cost also includes the time involved in moving from stock pile to stock pile—and would of course be even lower if the Loader worked from only one stock pile. In reporting these facts, A. N. Leverone, the company's president, further adds, "In our opinion the principle of the continuous flow of material as incorporated into your Bucket Loader guarantees high capacity loading at a steady uniform rate with a minimum of maintenance and operating expense."

## Broad Range of Users Cuts Costs with Heavy-Duty B-G Loaders



447573

Modern Controls Aid Operators Conveniently banked controls help make any man an expert operator quickly. Hydraulic boom hoist is power operated. Hydraulic brakes on main drive wheels.



84806

Boom Cradles For fast transport, boom quickly lowers to horizontal position to give low clearance. Two travel speeds—turning diameter is 31 feet.

Builders, general contractors, state and highway departments, material dealers, aggregate producers, black dirt contractors—all report new low costs in truck loading with the B-G 545-A Loader. This heavy-duty, 3 cubic yards per minute Barber-Greene provides high capacity loading of all free-flowing materials such as stone, gravel, sand, cinders, coal, coke, top soil, fertilizer, etc. Mounted on tractor-type pneumatic tires with automotive steering, the 545-A combines mobility and maneuverability with compactness. It gets around quickly in cramped areas and can be readied in a few minutes for moving from one location to another. With its Spiral Feed and welded steel buckets, the 545-A loads clean—has the ability to dig into bank top soil or shoulder. Completely modern in design the 545-A has centralized operating controls, floating boom, automatic overload release, self-locking adjustable swivel spout, heavy-duty battery, electric starter and other advanced features.

### Loader Pays on 4,000 Tons Per Year

"Gives Us More Trucks," says Firm Head

Lake Forest, Ill. — Two years of loading aggregate with a B-G Bucket Loader persuaded the G. L. Blanchard Company to purchase a duplicate machine for loading their stoker coal—although their yearly volume is only 4,000 tons. Now in its second year of service, the additional B-G Loader has proved to be an excellent investment.

E. G. Lindenmeyer, president, reports, "the savings in the loading operation itself are only part of the story. Our real saving is in truck time. During our rush season the machine is invaluable and, in effect, it gives us more trucks."

So far, the G. L. Blanchard Company has handled 39,000 tons of lime, stones, sand and gravel with their first Barber-Greene, and to date their repairs for both machines have totaled zero.

# USERS REPORT BROADEST RANGE OF JOBS HANDLED BY VERSATILE BUCKET LOADERS



For low clearance and long reach the B-G 522 Loader is equipped with swivel discharge conveyor which has a swing of 140°. Ready for truck towing at 20 m.p.h. with no adjustments. Loader easily converted to Snow Loader.

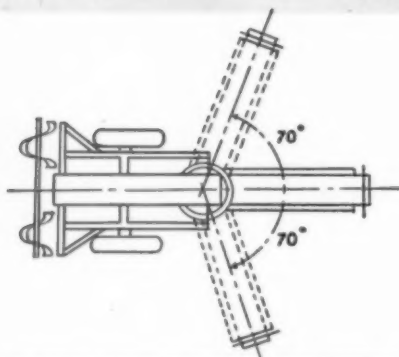


The 522 is also available with high boom and swivel spout. If low clearance is not necessary, this model is often chosen as it is lower in initial cost and provides the same capacity, portability and other performance features. The high boom type can be equipped with vibrating screen for scalping oversize.

## SAN FRANCISCO FINDS MULTIPLE USES FOR BUCKET LOADER . . . VARIETY OF COST-REDUCING PERFORMANCES REPORTED

**San Francisco, Cal.**—When the Park Commission here bought an 82-A Loader with gravity screen, it was for one purpose: namely, beach cleaning. This was the job they had in mind, for the 82-A has gained quite a reputation for removing glass, nails, and other dangerous rubbish from city beaches. It wasn't long, however, before the broader usefulness of the 82-A was discovered. Now it's used for clearing away sand accumulations in the dividing strips on the highway, stripping loam, excavating for park paths, and regular truck loading, along with its beach-cleaning duties.

**Milwaukee, Wis.**—Elmer Engler Company, landscape gardener here, has been using Bucket Loaders for stripping top soil for the past ten years. Their latest Loader, an 82-A, was delivered in 1947, and since then has loaded and screened thousands of yards of clean top soil—300 to 400 yards per day—stripping from field or stock pile. Even in stripping operations they report a 5-yard truck is loaded in 4 minutes, and the high discharge of the 82-A facilitates stock-piling without the use of any additional equipment.



The above diagram shows the 140° swing of the swivel discharge conveyor 522.

**Automatic Overload Release Saves Time and Maintenance**—All B-G Loaders are equipped with an automatic overload release mounted on the bucket loader head shaft. It automatically trips on overload and automatically resets itself.



**Hollywood, Cal.**—To provide safety for participants in the "Sport of Kings" the Hollywood Turf Club and other Coast tracks use an 82-A Loader with special screen attachment to keep the turf free of pebbles which might cause injury to horses.

## B-G LOADERS GET THERE FAST—MANEUVER EASILY

The Model 522 B-G Loader combines convenience, capacity and adaptability with a low initial investment and extremely low operating cost. It handles the broadest range of free-flowing bulk materials—as much as 1½ cubic yards per minute—and, as such, is a widely used machine among highway maintenance departments, contractors and municipalities. It is frequently used for leveling, landscaping and other similar operations.

The Swivel Conveyor Model 522 is designed to be low enough to avoid tree branches in street or road work—and to work inside warehouses or other locations where obstructions would ordinarily interfere. On its pneumatic tires, the 522 is towed behind trucks at normal speeds.

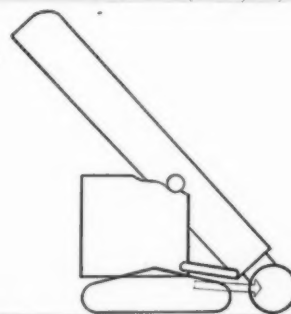
## 20 m. p. h. TOWING



## B-G FLOATING BOOM ADJUSTS ITSELF TO GRADES AUTOMATICALLY

### Assures Accurate Cleanup

The B-G Floating Boom provides for scraper thrusts to be exerted through push-arms direct from the crawlers. The boom is supported on rollers which allow it to automatically adjust itself to irregularities in the grade. This, combined with the follow-up scraper, makes possible a nice cleanup and digging to grade with a high degree of accuracy. Preliminary grades may easily be obtained—in the case of highway operations, for instance.



Floating boom design identifies all Barber-Greene's.

## A Feature of All B-G Loaders

The patented Floating Boom is only one of many features in common with all B-G Loaders. Others include the automatic overload release, the B-G Synchronized Spiral Feed, truck type transmissions, simplified controls, etc.

## LOADER HELPS DRY FERTILIZER

**Morocco, French Africa**—A large phosphate mine here uses a B-G 522 in an interesting aerating operation. Traveling down long windrows of phosphate, the 522 elevates the material and, in depositing it in neat, easily reclaimed piles, hastens the drying process.

# 125,000 TONS LOADED IN TWO YEARS TOTAL REPAIRS LESS THAN \$7500

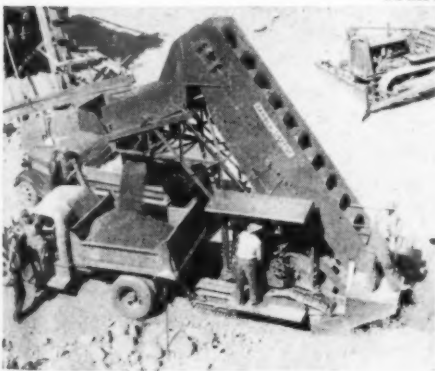


## Aggregate Firm Tells Record of B-G Loader

Milwaukee, Wis.—H. F. Reinkel of the Lake Shore Stone Company claims he has the best stock pile loading unit on the market today in his B-G 82-A Loader—and backs his claim with impressive figures:

In the past two years, this Loader has handled 125,000 tons of sand—yet repair costs have been less than \$75.00. In an 8-hour day, up to 710 tons are loaded by this crawler-mounted Barber-Greene. Operating the year around, the 82-A successfully breaks through frozen sand, and with its Spiral Feed, pulverizes it to make possible high capacity loading under rigorous conditions.

Mr. Reinkel sums up with the information that with his 82-A, he can exceed the loading capacity of much costlier and less versatile equipment.

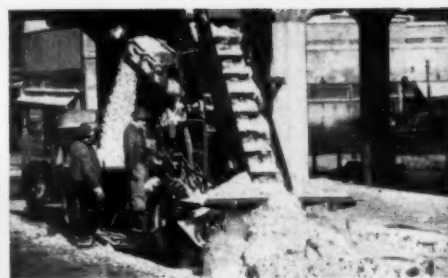


wherever soft or unsure footing is encountered and/or where maximum traction is desirable. This versatile, heavy-duty loader handles up to 3 cubic yards per minute, is available with a wide variety of accessories such as gravity screens, bar screens, vibrating screens, etc. It is widely used as a component of the Barber-Greene Travel Plant where it tows the Mixer and loads it from windrowed material.

## ROAD CONTRACTOR AVERAGES 1,000 TONS PER LOADER, PER DAY

Mechanicville, N. Y.—There's a 93,000 ton hole in the ground near here where two 82-A Loaders excavated, screened and loaded bank run gravel for a State road project.

Collins Brothers, Road Contractors, put the Barber-Greene's to work after turning down other types of excavating and loading equipment as too expensive and too slow. The gravel deposit was found in a flat meadow and after scrapers had removed the overburden, the 82-A's took over the job on their own. They each excavated and loaded up to 1,000 tons per day, leaving a 25-foot hole covering many acres—plus a remarkable record for getting a big job done at minimum cost per ton.



Mechanicville, N. Y.—Regular summer service as a Bucket Loader, plus additional value in winter as a Snow Loader, wasn't enough for this 522. Commissioner of Public Works now reports it's used to help keep the 21 miles of city streets free of leaves during the fall.

## CITIES CONVERT BUCKET LOADERS TO SNOW LOADERS FOR YEAR-ROUND SERVICE

### Removes 6-inch Fall in 18 Hours

Hagerstown, Md.—The first time this city's newly acquired 522 Snow Loader was put to work on snow removal, it removed 6 inches of snow from 3 miles of streets in less than 18 hours. According to J. A. Abbott, Jr., Superintendent of Streets, the 522's performance far exceeded that of other loaders used in the past. It was especially impressive in view of the fact that this was the first time it had ever been used, and also sufficient trucks were not available to keep it operating continuously. Mr. Abbott states, "I personally feel that the 522 Barber-Greene is the answer to the snow removal problem. It is economically priced for use in small towns and several could be used to solve the same problem in larger towns."

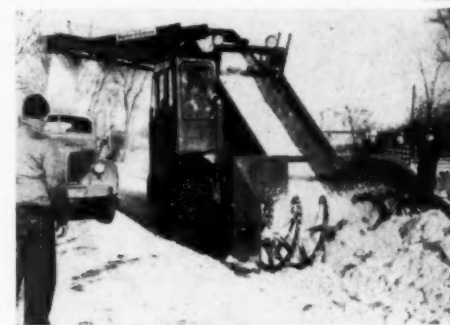
### Helps Immensely on Snow Removal

Johnston, N. Y.—At negligible cost, this town has converted its 522 Bucket Loader into a Snow Loader capable of handling up to 5 cubic yards of snow a minute. Mr. A. H. McCaffrey, city engineer, affirms that the economies of snow removal are well appreciated by city officials and that the Model 522, with the aid of a few trucks, eliminates congestion and slowup of traffic caused by snow, especially in the business section.

Added incentive to use the 522 to clear streets fast in many cities is maintenance of parking meter revenue—a valuable source of income that suffers when streets are clogged with snow.

### Removes 20 Yards of Snow Per Minute

For snow removal on a large scale the 548-A Loader offers the impressive capacity of up to 20 cubic yards per minute. Pneumatic-tired, with 4-wheel drive, it travels at 7 miles per hour road speed. Swivel conveyor allows trucks to travel in the same direction as the Loader. And the 548-A is convertible to a Bucket Loader.



## Loaders Pay Off at Bottom of River

Reno, Nev.—Down in the dry river bottoms near here, three B-G Loaders are efficiently at work reclaiming, screening and loading aggregates for the State of Nevada. Equipped with double-deck vibrating screens, the Loaders are able to segregate aggregates into the sizes required—making reclaiming, loading and screening a simple, simultaneous operation. Crawler-mounted, the 82-A's have the stability required for working in locations such as this.

### Crawler Mounting Often a Must

The full crawler mounting of the 82-A helps make possible its record performance

THE **B-G** LINE CUTS COSTS ALL ALONG THE LINE..

## See Barber-Greene for:



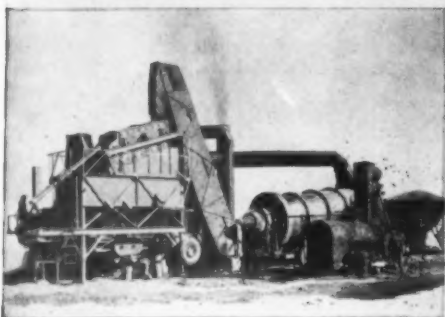
**B-G PORTABLE CONVEYORS:** For moving all bulk materials and packaged goods. Variety of lengths, belt widths and capacities. Electric or gasoline power.



**B-G DITCHERS:** Crawler and pneumatic tire mounted, for digging trenches from 5 1/2" wide, 4' deep to 24" wide, 8' 3" deep.



**B-G PERMANENT CONVEYORS:** Complete, standardized equipment including carriers, take-ups, drive frames, etc.



**B-G BITUMINOUS PLANTS:** Highly portable plants for producing all types of mixes—up to 120 T.P.H.



**B-G FINISHERS:** Automatically place smooth level surface regardless of variations in subgrade.



**B-G COAL YARD EQUIPMENT:** Belt and chain-and-flight Portable Conveyors; self-propelled, pneumatic-tired. Also, hopper-car Unloaders.

### To Help You Cut Corners . . .

### Barber-Greene Experience is at Your Service

Cutting costs these days is of major importance to everyone whose business involves the handling and rehandling of bulk materials. And it's a subject in which Barber-Greene representatives are well versed and widely schooled—in which their advice may prove

invaluable to you. If you're attempting to cut costs by eliminating the use of expensive equipment and manpower, see your Barber-Greene distributor or write directly to Aurora, Illinois. You may be sure your problem will gain quick and helpful consideration.

Barber-Greene Company  
Aurora, Illinois  
Cable address "Bargreene"

Send information on the Barber-Greene's checked below as indicated:

- ☐ 545-A Loader
- ☐ 522 Loader
- ☐ 82-A Loader
- ☐ 522 Snow Loader
- ☐ 548-A Snow Loader

☐ Other B-G Equipment

☐ Have a Representative Call

Name \_\_\_\_\_

Company \_\_\_\_\_

Position \_\_\_\_\_

City \_\_\_\_\_

Zone \_\_\_\_\_

State \_\_\_\_\_

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**Before You Buy . . .**

**Send This Coupon**

Don't overlook any opportunities these days to widen your margin of profit! In the Barber-Greene line there are many machines—many opportunities—for efficient application to help you bid successfully, to help you operate your business more efficiently.

Fill in and send this coupon to get full, prompt information on the Barber-Greene equipment which interests you. Or see your Barber-Greene distributor.

**BARBER-GREENE COMPANY**  
Aurora, Illinois

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for Long Life and Low Maintenance Cost of

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*2-Speed Truck*

# AXLES

Positive lubrication of all vital parts—even at slowest speeds where gear-tooth loads are often highest—is an important factor in the outstanding long-life and low-maintenance cost record of Eaton 2-Speed Axles. In less than one revolution of the bevel gear, oil begins to flow to all moving parts, and the supply is automatically adjusted to meet the demands of operating speed. This abundant lubrication of all gears and bearings reduces friction and wear with consequent longer axle life and lower upkeep cost. Eaton 2-Speed Axles are available for most trucks of the 1½-ton class and larger. See your truck dealer for complete information.

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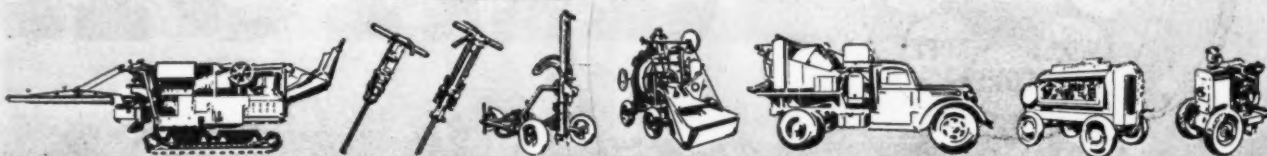


### Construction Expenses at Rock Bottom!



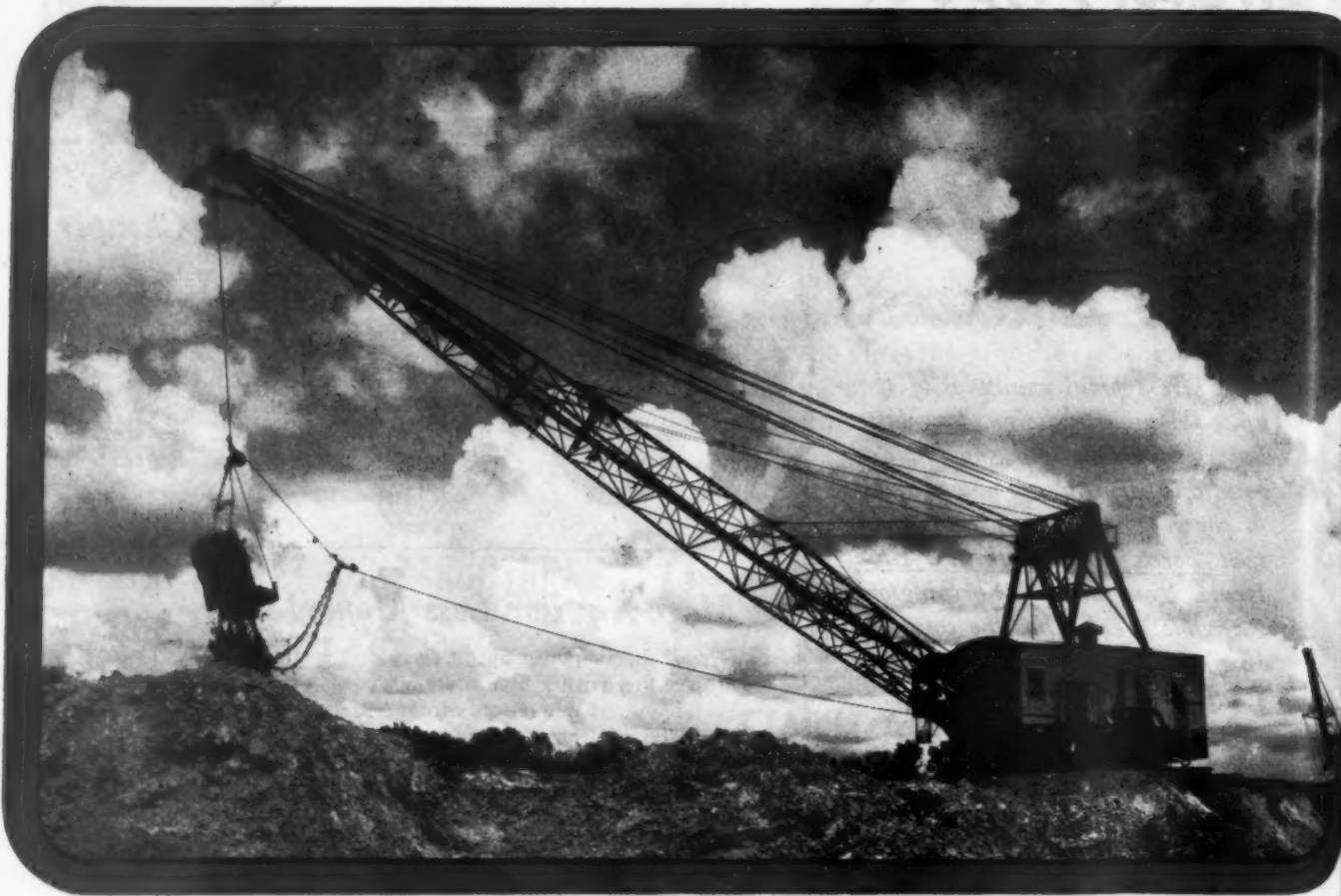
Team up these fast, hard-hitting Blue Brute Air Tools with Blue Brute Compressors — and watch your daily expenses go down. Though tough and powerful, they have the lightness and compactness to keep your workers more satisfied—and more productive.

H9-3



**IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB**

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## Tests Prove Service Life of Tuffy is Greater

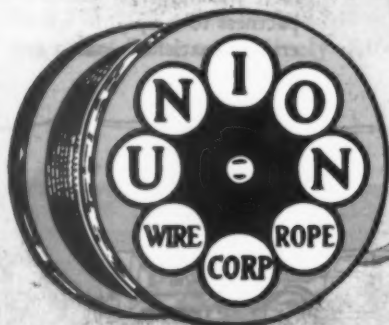
"After moving 1,834,000 cu. yds., the superintendent is very pleased with Tuffy Draglines, especially because they are digging back from a very steep slope in a 70 ft. hole under tough abrasive action. On basis of this performance, another set of 2½", 280' Tuffys, a set of 2", 225' Tuffys and a 2½", 216' and 2½", 224' Tuffy for a twin drag machine have been ordered to replace competitive ropes."

"Tuffy Dragline's ruggedness gave well over 300 percent improvement in performance plus considerable time saved changing lines."

From all parts of the country, replies such as these verified the claims made by Union Wire Rope engineering specialists who

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Teleph  
This Co

# ed DRAGLINES . . . ge Everything Except

the **NAME Tuffy**

the **SIZE ? inch**

the **LENGTH ? feet**



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Extra flexibility and maximum abrasive resistance are built into Tuffy Draglines to assure dependable performance on any type of equipment—handling any type of material. Wet and dry dirt, sand, rock, gravel, cement, minerals, all give way to Tuffy's structurally tough construction. At high speeds or low speeds, Tuffy Draglines give top operating efficiency; they hold securely to drum when casting, ride better on grooves and are easier and safer to use. Put Tuffy to the test! He's built tough!

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That's why Earth Mover All-Weather tires — like *all* Goodyear work tires — are first choice with users everywhere. They stay first choice year after year, because they keep delivering low-cost, long-life performance. Remember, always **BUY** and **SPECIFY** Goodyear—it pays!

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for each job!



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**HARD ROCK  
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for super-stamina in  
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MORE YARDS ARE MOVED ON GOODYEAR OFF-THE-ROAD TIRES THAN ON ANY OTHER KIND

## More Speedy Road Jobs of '48

**How fast did you get the dirt and rock out? Asphalt, tar or concrete placed? Your project completed? And with what equipment? Here are a few additional summaries of 1948 jobs that seem noteworthy in speed or efficiency**

### Fast Work in Iowa

*200,000 cu. yd. per month pace set by Central Construction Company on "heavy" relocation.*

Good weather gave Iowa road contractors an exceptional opportunity in 1948 to show what their new and old equipment could do on dirt yardage. One of the best runs was that reported by Central Construction Company, Indianola, Ia. This company had a 3.35-mile river-side relocation of US 77 on the edge of Sioux City. Main quantities included 774,663 cu. yd. of borrow excavation, 29.8 acres of stripping, and some pipe placement. The bid of \$276,370 also included removal of an old timber bridge.

Equipment used included 3 Caterpillar DW-10 scrapers, 3 LaPlant-Choate motor scrapers, 2 D8 Caterpillar tractors with dozers, 2 D8 Caterpillar tractors with sheepsfoot rollers, 2 No. 12 Caterpillar motor graders, and necessary servicing equipment.

The job got under way around Aug. 1, working single shifts for awhile. Some equipment was put on a 22-hour basis (two shifts) mid-September, and early in October the La Plant-Choate scrapers also went to 22 hours. Despite soil conditions, described as unusually difficult, yardage reached a peak of 200,000 per month. One huge cut had a maximum depth of 140 ft., while fill depths never exceeded 12 ft. The grade was built 68 ft. wide. C. G. Milulanec, superintendent; Carl Y. Sernstrom, resident engineer. Booth and Olson, of Sioux City, had reinforced concrete culverts and a bridge under separate contract.

The De Salvo Construction Co., Cincinnati, made good time with a com-

pact outfit on an arterial project through Arlington Heights and Lockland, near Cincinnati. This firm moved 7200 c.y. per 9-hr. day at peak, on an average 2500 ft. haul, using a 2½-yd. shovel, 4 Caterpillar DW-10 wagons, 4 Caterpillar DW-10 scrapers, 4 Koehring wagons and 1 Euclid wagon. A Rex 34-E dual-drum paver placed the 106,000 sq. yd. of 9" x 24' concrete.

### 62,000 Tons of Hot-Mix

Producing and laying sixty-two thousand tons of asphaltic concrete in one season on three projects added up

to a busy 1948 year for Rubin Construction Company, of West Palm Beach, Fla. A thumb-nail sketch of this firm's operations is as follows:

**Projects** consisted of three sections of U.S. 1 in and near West Palm Beach, totaling 14.2 miles, and with widths varying from 30 to 61 feet. One of the jobs was a subcontract under Brinson Const. Co. of Tampa. Value of contracted or subbed work was \$455,000.

**Improvements** totaling 10.7 miles consisted of a leveling course 1-in. binder and 1-in. surface course; for the 3.5 miles subbed work, the binder and surface course over new base.

**Plant Equipment** included a Simplicity System A-S-50 asphalt plant, powered by a No. 671 GM diesel motor; Cleaver-Brooks 125-hp. boiler; Bay City 45 clamshell crane for unloading cars and feeding the plant; second Bay City assisting when



★ Scenes during progress of the Iowa job





★ Simplicity system asphalt plant of Rubin Construction Co., and paving equipment which placed black-top materials for 14.2 miles of roadway 30 to 61 ft. wide in single season



needed; fleet of GMC and Chevrolet trucks with various dump bodies for delivery of mix; motor grader (make not specified) for spreading the leveling course; two Barber-Greene finishers; two Galion tandem rollers; Etnyre distributor for applying tack coat, mounted on a Dodge HD truck.

**In Charge:** L. M. Kyzar, project engineer for state; L. D. Brinson, contractor's superintendent.

### 750,000 Yd. in 100 Working Days!

Dean Skinner, contractor from Austin, Texas, completed a 750,000 cu. yd. grading job for the Texas highway department on US 67 in Rockwell County. This job, which included some borrow, took 100 days of work. Outfit: one 1½-yd. shovel, 4 Caterpillar DW-10's with wagons, 6 Super C Tournapulls.

### 23-Mile Hot-Mix Job

Haggard Construction Co., of Fargo, N. Dak., improved 23 miles of U.S. 52, Drake to Harvey, N. D., last year. Major item was a 2-in. asphaltic concrete top 24 ft. wide, built on a 32-ft. wide base consisting of 5 in. pit-run gravel and 2 in. layer of stabilized base. Roadway graded 36 ft. wide. Seal coat. Equipment included a Standard 3000-lb. pugmill stationary plant; a Diamond aggregate plant with 10x36 jaws and 30x20 rolls; a Jaeger bituminous paver; two

HD-14 Allis-Chalmers tractors (feeding crusher); 1 dozer; 1 Gar-Wood 12-yd. scraper.

With this rather simple outfit, this firm produced pit-run gravel at rates as high as 140 tons per hour, stabilized or processed gravel at 155 tons per hour, produced hot mix and placed pavement at 140 tons per hour maximum. Some of the quantities: 24,600 c. y. pit-run base (used on 7 miles), 17,730 tons gravel-clay stabilization, 39,029 tons combined aggregate for asphaltic concrete.

### 187,000 Cu. Yd. in Single Month

This excavation yardage figure for a single month, working in 10-hour days, was chalked up by A. R. Burton Company, Inc., of Lynchburg, Va. The job was on US 19 and 23 in Buncombe County, North Carolina. Length 4.68 miles. Job included 19 acres clearing, 490,000 c.y. excavation, 1200 c.y. structural concrete.

The earthmoving outfit consisted of 3 Caterpillar D8 tractors with LeTourneau LP scrapers, 3 Caterpillar DW-10 units with LaPlant-Choate pans, two D7 tractors with dozers, necessary sheepfoot rollers. J. F. Crippen, superintendent; George R. Prescott, resident engineer.

### Another Fast Concrete Paving Job

A 2530 lin. ft. day on May 13 last year, and another day of 2570 lin. ft. on June 15, were reported as the best days for Streu Construction Company, of Two Rivers, Wisconsin, on a 217,600 sq. yd. paving project. The job consisted of 18.6 miles of 7" x 20' concrete on sand and gravel base, plus 28,000 cu. yd. of gravel surfacing and 974 stations of roadway finishing.

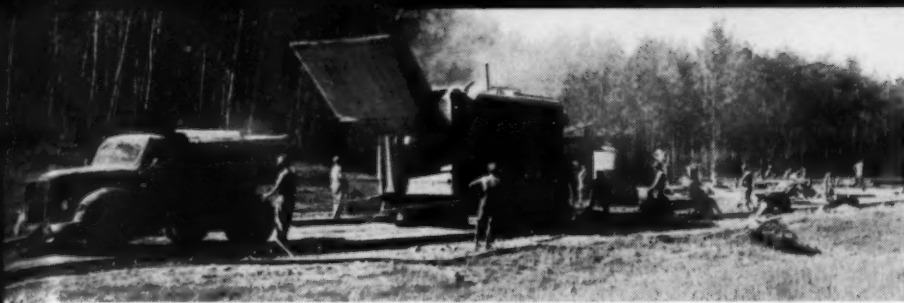
This contractor used a Rex 34-E dual-drum paver, a Jaeger finishing machine, a Koehring longitudinal float finisher, a Buckeye finegrader, an Allis-Chalmers HD-7 with bulldozer, an A-C HD-10 with Gar-Wood scraper, a Koehring Trailgrader, 1 Butler cement bin (275 bbl.), 2 Butler material bins (each 40 yd.), a Manitowoc and a Koehring crane for loading bins, two 1200-gal. tank trucks, 9000 lin. ft. of Metaforms, 1 Austin-Western No. 99 grader; 26 batch trucks on long haul, 2 trucks hauling bulk cement.

The concrete road forms were of 9-in. height, set 2 in. into the subgrade. Also used was a portable 2000-gal. supply tank with pump for supplying water through 600 ft. of 1½-in. hose. This unit, which was operated in position between forms, was moved ahead several times daily.

The Streu outfit began paving May 3 and was done by July 28 despite several moves of the paving outfit and one move of the plant.

★ One of the large cuts and fills on the Burton contract





★ General view of Streu's paving operations, and glimpse of trailer-mounted water tank and tank truck used to supply paver



A Lippmann portable screening and washing plant was also employed. Cement, by the way, was handled by both screw and by a Butler Carscoop, since the contractor was unable to obtain enough covered hoppers; both box cars and covered hopper cars used.

W. C. Steu superintended the job. Henry Winot was construction engineer for the state of Wisconsin.

### Loaders in Big Performance

The productive capacity of heavy-duty loaders was demonstrated on this project at Downey, California, where three Traxcavators mounted on D4 Caterpillar tractors moved 21,000 cu. yd. of earth in six days. The project, a 1½-mile road job. Contractor, C. R. Butterfield Company.

### Big Cities Install Parking Meters

More large cities are adopting parking meters, according to a report of the Municipal Finance Officers' Association, as summarized by Highway Research Abstracts.

In the past the parking meter field was used most extensively by the smaller cities. In 1947, cities under 25,000 in population using parking meters increased 71% over the number using them in 1946. But recently more large cities have been installing meters.

Detroit is the largest city to make use of meters. In October, 892 meters were installed and an additional 612 are now being put in. Receipts for November from the original meters totaled \$11,699—an average of \$0.41 per meter per day.

Although their primary purpose is regulatory rather than money-making, parking meters are paying off. Each of 26 cities received more than \$100,000 in parking meter revenue last year and this number will be increased this year. The phenomenal increase in parking meter installations observed in 1947 when 640 new cities installed meters appears to be continuing in 1948.

Boston installed 5,000 meters in May and estimates it will receive \$300,000 revenue from them in the first seven months of their operation.

### Bero's Big Yardages

Bero Engineering & Construction Corp., of Buffalo, N. Y., as usual moved a lot of stuff in 1948. On the Oneida County Airport, Oriskany, N.Y., this firm reached a peak monthly output of 450,000 c.y. grading, 25,000 c.y. stone placement, 30,000 tons gravel placement, and 12,000 tons blacktop. The main quantities on this job were 1,265,000 c.y. excavation, 50,000 tons stone base and 40,000 tons gravel foundation, so it was a short run at the pace reported. Two Adnum blacktop pavers were used, along with 2 Manitowoc 2-yd. shovels, 9 Euclid bottom-dump wagons, 1 elevating grader, 1 Lorain shovel, 9 Tournapulls and five Caterpillar D-8's with scrapers.



★ Screed device towed by Streu's paver

Reading, Pa., anticipated a yield of \$15,000 from meters installed only this year. The yield from parking meters in Evanston, Ill., is expected to total \$70,000, with the meters in operation only since April 1.

Installed in October, 1947, San Francisco's 3,500 meters yielded \$18,000 in revenue in the first 9 months of operation. Des Moines, Iowa, received \$18,000 in revenue from its 1,200 meters in 3 months of operation last year. Providence, R. I., expects to receive \$125,000 from its meters this year—the first full year of operation.

Other large cities that have had meters for some time, and the yields that they expect from this source in 1948 are: Cleveland, \$211,500; Washington, D. C., \$97,787; Buffalo, \$125,000; Newark, \$125,000; and Denver \$340,000.

### "Surface Drainage of Highways"

is the title of research report 6-B issued by the Highway Research Board, 2101 Constitution Avenue, Washington 25, D.C. This bulletin includes a committee report and three papers sponsored by the Committee on Surface Drainage of Highways, presented at the 27th Annual Meeting of the Board.

"Your Land Surveys, Maps and Titles," by Fred C. Morris, Department of Civil Engineering, Virginia Polytechnic Institute, Blacksburg, Virginia; 95-pages. Engineering Experiment Station series bulletin No. 71; presents much useful data on such subjects as the status of land surveys, geodetic control points, plane rectangular coordinates, maps.

★ Loaders picked up shallow earth and road materials at fast pace on this California job



## ★ Idle Equipment on Job Still Challenges

Public Roads Administration engineers are performing an important service to roadbuilders, particularly to contractors, in their recent studies of equipment utilization on the job. Elsewhere in this issue is a report which is indeed enlightening. Despite the fact that contractors are supposed to have become highly efficient operators, one-half to three-fourths of the total available working time of the major equipment is being lost in delays, it would seem from this report. At least that was the case in the projects covered.

Of course weather can take the rap for part of these delays. But in the case of major delays, weather is accountable for only half the time lost. And minor delays continue to add up to a surprisingly large total of lost

time; those little 15 minute work stoppages seem of small importance individually, but they certainly add up.

Getting the most out of equipment is the very heart of the efficiency problem in modern road building and heavy construction. It would appear that the old-time contractor who worked with a swarm of mules, scrapers and manual workers achieved a higher percentage than today's operator, who has a more complicated task since equipment units are dependent on each other and when one breaks down or doesn't fit with a matched fleet, the other equipment is handicapped.

A good superintendent is still the best bargain a contractor can buy.

## ★ A Real Cost Analysis

Last month in ROADS AND STREETS California engineers presented one of the most thorough analyses of highway construction costs available since the war. A careful study of this article leads us to make several observations.

Firstly, cost indices used by the various state highway departments and other agencies will bear double checking. The index used should be based on actual highway construction costs rather than on general construction costs.

Secondly, few of us have really wakened to the impact of inflated prices on *ultimate* highway development programs. We are painfully conscious on letting day that this or that immediate project goes for a high sum. But what of our 10 and 15-year programs? Inflated prices, together with the standards of design needed to meet modern traffic demands, have resulted in such high cost estimates for future highway work that a lot of people are scared. A 5% to 10% "leveling off" of prices isn't going to alter the situation fundamentally.

Since the article in question was written (late in 1948), the boom in this country has reached its peak, and the future is anybody's guess. But few signs point to any substantial lowering of costs of construction

because wages, which are an element in the cost of every job as well as of equipment and materials that go into every job, are not likely to come down very far. Contractors may temporarily cut with their prices to get jobs, but if they cut their profits too low, nobody would gain in the long run.

Thirdly, we need to sell our citizens on a new way of looking at road costs. As a nation we haven't yet wakened up to the fact that highway transportation costs will represent an increasingly large part of the total national economy. We've hardly begun to pay the war damage to our roads, let alone really modernize. All in all road costs will remain high for years to come, but they will seem cheapest if faced squarely and recognized as part of the cost of our way of life. Perhaps we should quit talking about dollar cost of construction, and think and talk in terms of service rendered; of the direct and indirect penalties of delayed road betterments; of the benefits that make well planned facilities self-liquidating. When we do talk costs, we might better use vehicle-per-day cost or some other sensible yardstick, as Commissioner MacDonald suggests, since construction cost after all is merely a ledger item in our bookkeeping.

## ★ Both Sides in Dead Earnest on Truck Weights

The adoption in Indiana last month of 22,400 lb. as the maximum axle load limit for "specified" arterial highways, is just one of many local pieces in a national mosaic. Legislatures in most states are being asked to let down the bars, and it seems that the trucking interests are really throwing their weight into the fight.

Highway officials are also throwing some weight, and it remains to be seen how effectively. At the recent

North Atlantic States annual meeting in Boston, a resolution was passed urging that the highway department members enter into a compact to be known as the Boston Compact. The objectives are to seek nationwide adoption of the AASHO standard of 12' 6" maximum height; adherence to 18,000 lb. maximum single axle limit; ditto for the group axle load limits adopted by the AASHO, April 1, 1946; and to see all future

motor trucks and combinations manufactured in accordance with these standards after proper notice. In a lengthy preamble the North Atlantic committee forcefully stated the case for limiting heavy loads. Noting that in 1946 the AASHO in cooperation with PRA had revised its recommended limits upward after painstaking research, in an effort to preserve a realistic balance between truck demands and highway roadbed limitations, this statement goes on to describe the tremendous growth in trucking.

Today, one out of every five motor vehicles manufactured is a truck. Motor freighting has grown vastly and the truck has become a vital part of the servicing of the economy of the nation. In the course of this growth, trucks have long since wandered off the main arteries and are now using all classes of roads. In fact, secondary roads are carrying many trucks which have been re-routed in an effort to evade state weight inspection.

State highway officials no longer have just the job of building roads. They have the job of providing an adequate transportation service—an entirely different conception. This conception carries with it the solution of grave economic problems, such as what percentage

of the tremendous and accelerating highway depreciation is chargeable to heavier vehicles, what percentage of the total highway revenue should be paid by these heavier vehicles—and whether to let down the bars for the future. This decision carries with it the necessity to plan heavier future roadbeds, and meantime let billions of dollars worth of existing roads be destroyed by traffic for which they were never designed.

California studies have shown that literally half the highway wear and tear is due to the damage caused by a very small percentage of extremely large and heavy vehicles. More study of this problem is needed, and the searchlight of publicity needs to be turned on the facts, once ascertained. Are truckers willing to “pay the freight”?

Behind the tussle lies a simple physical fact: truck transportation need not be hampered by limitation of axle loads to 18,000 lb. Additional axles can be built into trucks to help spread the loads. The added truck manufacturing and operating cost will be minor compared to the indirect cost that someone—all of us—will eventually have to pay unless truck loads are sensibly limited and limitations strictly enforced.

## ★ One Sentence Editorial

As you read the Western Blizzard article in this issue,

remember—it can happen again and probably will.

## ★ The Aim of Education

“To decry specialization in education is to misinterpret the purpose of education. The true aim of the teacher must be to impart an appreciation of method and not a knowledge of facts. This is far more readily achieved by concentrating the student’s attention on a small range of phenomena than by leading him in rapid and superficial survey over wide fields of knowledge.” This statement appears as a footnote in “The Grammar of Science” by Karl Pearson, professor of applied mathematics and mechanics, University College, London.

The method to which he refers is: “The classification of facts and the formation of absolute judgments upon the basis of this classification—judgments independent of the idiosyncrasies of the individual mind—essentially sum up the aim and method of modern science.”

For the most part Pearson’s conception of the function of education is excellent. It seems to us that he

should have stressed systematic fact-gathering as a very important part of all educational training; also the carrying of education far beyond the “appreciation of method”. It is one thing to appreciate the desirability of taking daily physical exercise. It is quite another thing to have formed the habit of exercising. The same holds true of mental “exercise.” Deficient training in searching for data usable in solving a given problem seems to be a common defect in the formal education of engineers. Nor does this defect seem to be overcome by a sufficient number after graduation. Knowing what formulas or principles to apply is of little value to the graduate who does not recognize sufficiently the importance of gathering enough data from which to select those applicable to the given problem. This recognition is more apt to be found in the engineer who had practiced fact-gathering the hard way.

## ★ Increasing Public Works Activities

ACCORDING to the Monthly Labor Review, expenditures for public works were \$4,035 millions in 1948 as compared with \$3,084 millions in 1947, which is an increase of about one-third. Private construction during those years, respectively, was \$13,631 and \$10,893 millions, which is an increase of about one-quarter.

During the first two months of 1949, the following were the percentages of

increased construction over that in the same months of 1948:

Total Public Works	42%
Highways	34
Sewer and Water	42
Conservation and Development	35

The last named class of public works includes “dams, locks, reservoirs, levees, revetments, channels, canals, drainage ditches, pump houses, transmission lines, piers, etc.”, which,

for the most part are hydraulic works constructed by the federal government; and exceed in value the construction classed as Sewer and Water.

Private construction in January and February 1949 was only 5% greater than in 1948, and seems likely to be less in 1949 than in 1948; thus contrasting strongly with public works, which bids fair to show an increase of 40%.



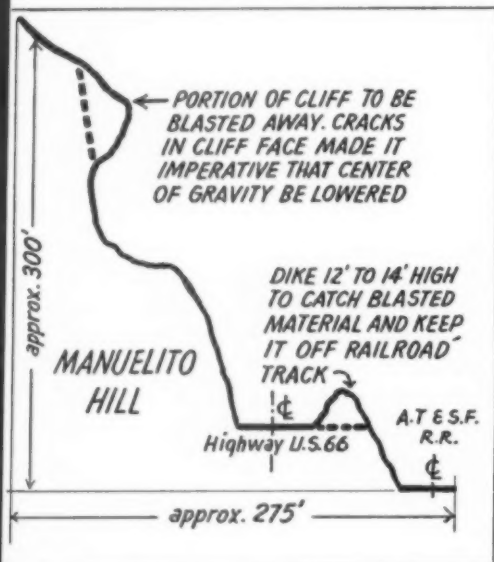
★ Before, during and after the blast—note how overhang was neatly shot away



★ Watching the blast—N. Mexico's commission chairman L. E. Ruffin, PRA representative Cheatham, contractor Skousen, project engineer Gaylor

# How a Blast Was Confined

## to Protect Adjacent R.R. Tracks



★ Profile of job at blast location

*Trough at base of cliff to be blasted proved effective safeguard in this situation, along with good judgment in planning blasting details.*

**By Lindsay F. Root**

Assistant Administrative Engineer  
New Mexico State Highway Department,  
Santa Fe

THE "Battle of Manuelito Hill" was won by an expert powder man in the employ of the Skousen Construction Company of Albuquerque, New Mexico, which on April 23, 1948, obtained the contract to rebuild 10.96 miles of U.S. Highway 66, between Gallup and the Arizona State Line, at a cost of approximately \$955,000.

After a twenty year period, U.S. 66 is following its original line around

Manuelito Hill, while its face is being widened near the Arizona Line. Twenty years ago U.S. 66, between Manuelito and Rocky Point, ran up a canyon and back of Manuelito Hill. Then the Highway department with great pride, carved a super highway across the face of Manuelito Hill, some 24 ft. wide. Today this road is totally inadequate for the traffic volume carried, and a 44-ft. road is now under construction.

In order not to inconvenience travelers, this department specified in its contract that a paved detour be constructed along the old alignment abandoned some twenty years ago. R. H. Gaylor, project engineer, reports that at one point the paved detour cuts

★ How the debris looked after being caught in the road, and Northwest shovel loading stuff into Koehring dumptrucks

50



across a stand of corn planted by a Navajo Indian that lives in a nearby hogan.

### Cracks in Cliff

The most perplexing problem in constructing this highway was a hill, Manuelito Hill, composed of sandstone cliffs and outcropping rocks, which had a steep slope about 300 ft. long, clear down to the A.T. & S.F. Railroad tracks, which hill skirted the new alignment. When the original contract was let it was thought that it would be an easy matter to cut away part of this sandstone hill and obtain enough width for this most important route through New Mexico.

During construction it was noted that overhanging cliffs were not too substantial, cracks were opening behind the overhanging shelves, and that it would be necessary to cut away more of this hill than anticipated. A supplemental agreement was entered into between the highway department and Skousen Construction Company, to remove these overhanging rock cliffs.

Here was the problem. The slope was so steep that it would be practically impossible to blast off the rock shelves without covering the railroad tracks at the foot of the slope under tons of rock and debris, and in discussing the problem with the Santa Fe Railroad Company, it was decided to cover the tracks with slanting timbers, in order that rock debris loosened by the dynamiting would roll off the tracks and not cause any damage.

However, N. J. Skousen, President of the Skousen Construction Company, was confident that he could crumble the rock cliff in such a manner that none of it would fall down over the A.T. & S.F. tracks. In order to do this, Mr. Skousen's powder man used approximately 1000 lb. of dynamite, and constructed a high ditch on the slope, immediately under the overhanging cliffs and on the line of the new highway, to catch all rock that was loosened, he hoped.

The railroad company officials were still doubtful that a blast could be set off in such a manner as to cause them no trouble, and they proceeded to set in stringers parallel to the double tracks of the railroad, and to fill in a lot of ballast to take the shock of any rock that might fall onto the railroad.

On November 15, 1948, at 12:45 p.m., the blast was set off, and not more than a gunny sack full of small rock dropped onto the railroad tracks, with the big rock falling into the ditch that was prepared for it.

On paper this seems very simple, but it was really excellent work on the part of the powder man and his assistants that blasted the cliff down exactly as figured.

## Job Studies Reveal Serious Equipment Delays

*Highway Research Board Committee report shows 45% to 80% of total available working time of major equipment is still being lost in delays*

**S**IGNIFICANT data of wide interest to contractors and engineers have just been issued in Circular No. 54, Highway Research Correlation Service, under the Committee on Economics of Highway Construction and Maintenance Methods of the Board.

According to this report equipment production studies being conducted by the Production Cost Unit of the Public Roads Administration on active highway construction jobs reveal that from 45 to 80% of the total available working time of major equipment is being lost in delays. This fact is obtained from an analysis of the field studies made during 1947 and 1948 on 33 typical grading and surfacing jobs in Eastern states.

The summaries embrace a total of 55 major units of equipment, including dual drum pavers, asphalt plants, bituminous finishers, scrapers, shovels, and stabilizing machines for a combined period of 5,394 hours total available working time.

In table 1 is shown the percentage distribution of total available working time for all kinds and sizes of equipment combined. The figures are significant only to the extent that they show the approximate degree to which major construction equipment is actually utilized during the periods that work is under way on active highway construction projects.

**Table 1—Distribution of total available working time for major units of equipment on active highway construction projects**

Time element	Percentage of total available working time	
	Range	Average
Total available working time	100	100
Major delays <sup>1</sup>	33-63	45
Net available working time	37-67	55
Minor delays <sup>2</sup>	4-28	16
Actual productive working time	20-55	39

<sup>1</sup>Individual delays of 15 minutes or more in duration.

<sup>2</sup>Individual delays of less than 15 minutes in duration.

The total available working time is the sum of (1) normally scheduled daily shift time and (2) such occasional overtime as actually worked. Thus, if a job had a scheduled shift time of 8 hours daily for five days a week, and 2 hours overtime was

worked on one of those days, the total available working time for that day would be 10 hours. If Saturday was not a scheduled work day, but 8 hours were worked on Saturday to make up for time lost because of bad weather, these 8 hours would be included as part of the total available working time.

A major delay is an individual time loss of 15 minutes or more in duration which occurs within the total available working time. Major delays do not normally occur with any particular regularity. Nearly half of all major delays are due to weather conditions. Other major delays are caused principally by waiting upon auxiliary equipment, equipment breakdowns, and shortages of materials.

A minor delay is an individual time loss of less than 15 minutes in duration. Although minor delays usually occur for just a few seconds, they frequently add up to significant amounts in total. They are also due to a large variety of reasons, the principal ones being shortages of materials on surfacing jobs, shortages of hauling units on all jobs requiring hauling units, and equipment repairs.

The majority of major delays are not as costly as minor delays. Many major delays such as weather, cause the job to shut down over an extended period, thus reducing the contractor's pay roll and other current expense during the delay. During such major delays, however, charges for overhead, demurrage, etc., are incurred. During minor delays, on the other hand, the current expense is at a maximum since the contractor is working with a full complement of men and equipment.

Detailed summaries of the kind and extent of time losses experienced by specific classes of equipment will be reported by the Committee in the near future.

### 34E Pavers Delayed

Equipment production studies made on 34E dual drum pavers during 1947 and 1948 on active portland cement concrete paving jobs show that delays amounted to 56% of the total available working time. These studies were conducted on six eastern U.S. projects and covered periods varying from 125 to 185 hours on each job during the active construction season.

Table 2 shows the distribution of total available working time as obtained from these studies during the

period of observation. The total available working time is the sum of (1) normal daily shift time and (2) such occasional overtime as actually worked. Thus, if a job had a normal shift time of 8 hours daily for five days a week and 2 hours overtime was worked on one of those days, the total available working time would be 42 hours. The data in Table 2 are based upon a sample of 867 hours total available working time.

The extent of major and minor delays are also shown. Individual time losses of 15 minutes or more in duration are classified as major delays, whereas small time losses of less than 15 minutes in duration are classified as minor delays.

**Table 2—Distribution of 867 Hours Total Available Working Time for 34E Dual Drum Pavers on Six Active P.C. Concrete Paving Projects**

Time element	Percentage of total available working time	
	Range	Average
Total available working time	100	100
Major delays <sup>1</sup>	23-60	38
Net available working time	40-77	62
Minor delays <sup>2</sup>	14-23	18
Actual productive working time	24-57	44

<sup>1</sup>Individual delays of 15 minutes or more in duration. See Table 3 for detailed classification.

<sup>2</sup>Individual delays of less than 15 minutes in duration. See Table 4 for detailed classification.

<sup>3</sup>Minor delays amount to 29 % (18/62) of the net available working time.

The classification of major delays is shown in Table 3. These delays do not normally occur with any particular regularity nor is there much similarity between jobs.

**Table 3—Classification of Major Delays to 34E Dual Drum Pavers**

Nature of major delay	Percentage of total available working time
Rain and wet grade	15
Shortage of cement	6
Major moves on the project	6
Paver repairs	5
Waiting on auxiliary operations	4
Shortage of aggregates or water	1
Other	1
Total	38

The above classifications are largely self-explanatory. The time lost to auxiliary operations is due to such items as awaiting preparation of fine grade, setting of forms, finishing or spreading operations, and shortage of hauling units.

Although minor delays are ordinarily just a few seconds each in duration, it will be noted from Table 1 that they amount to 18% of the total available working time. However, the full extent of minor delays can usually be better visualized by comparing them to the net available working time rather than to the total available working time. For example, when minor delays are expressed as a percentage of the total available working time, a poorly managed job with frequent major delays

might show a less percentage of minor delays than a well managed job with few major delays. Thus, a better basis for comparison between jobs is to express the minor delays as a percentage of the net available working time.

The classification of minor delays is shown in Table 4. Among the six jobs which were studied, the minor delays varied from 22% to 40% of the net available working time with an average of 29%.

**Table 4—Classification of Minor Delays to 34E Dual Drum Pavers**

Nature of minor delay	Percentage of net available working time
Insufficient number of batch trucks at paver	7
Batch truck dumping delays	4
Short forward and reverse moves of paver	4
Aggregate bin empty at batch plant	3
Paver maintenance and repair	2
Waiting on spreader and/or finishing machine	2
Split discharge of batch	1
Out of water	1
Waiting on placement of joints	1
Operator and personnel delays	1
Other	3
Total	29

An endeavor was made to classify minor delays in accordance with their basic cause, but in those instances where the basic cause could not be determined, the delays were classified in accordance with the apparent cause. For example, the basic cause of a delay of a few seconds or perhaps a minute or two at the paver may have been due to a temporary breakdown at the batch plant; but if this fact could not be readily determined by the observer, the delay may have been charged to a shortage of batch trucks.

## Minnesota Wins Safety Honors

Minnesota has been awarded first place in the 14-state Midwestern region in the National Traffic Safety Contest for 1948, conducted by the National Safety Council. This is the eighth time Minnesota's efforts to reduce traffic accidents have won the state a first place in this contest, having won the regional award in 1934, 1935, 1936, 1939, 1940 and 1946 and the national grand award, or first place among all the 48 states, in 1942.

Beside winning the regional award, Minnesota was given special citation for outstanding achievement during 1948 in safety organization, in driver licensing, and in its accident statistics. Scoring in the contest is based partly on the traffic fatality record and partly on accident prevention activities.

In addition to the state's honors, three Minnesota cities also won national recognition. The city of Albert Lea won third place in the national traffic safety contest among cities of 10,000 to 100,000 population. Duluth

and Hibbing won special awards for school safety activities.

Friday has superseded Sunday as the second worst day of the week for traffic accidents, according to the Minnesota Highway Department's summary of 1948 accident reports. Saturday replaced Sunday as the worst day of the week a half dozen years ago. Of the 42,983 motor vehicle traffic accidents reported in 1948, the largest number, 7,937 occurred on Saturday, with 7,009 reported for Friday and 6,761 for Sunday. The other four days of the week had from 5,100 to 5,500. Sunday, however, was second to Saturday in the number of fatal accidents, with Friday third. December had the greatest number of accidents but October had the greatest number of traffic deaths.

## Texas Road Speeds

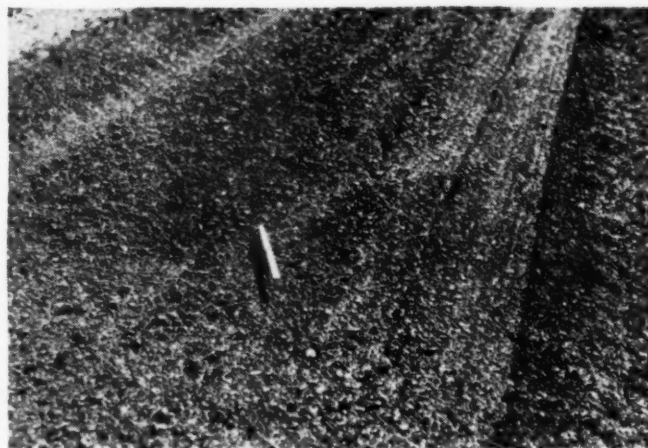
Texas motorists are speeding up. Such was the gist of a report issued today by the planning survey division of the Texas highway department.

Using 39 speed stations in rural areas and unincorporated towns planning survey observers found a sharp increase in average speed over 1946, and with the exception of motor trucks and buses, a sharp increase in speeds over 60 m.p.h.

The average speed of all vehicles in the 60 m.p.h. zones was 50 m.p.h., as opposed to 45 m.p.h. in 1946; but the percentage exceeding the 60 m.p.h. speed in 1946 was only 6.8%, while in the survey just completed 12.4% of all vehicles exceeded the 60 m.p.h. speed. Passenger cars jumped from 8% in excess of 60 to 14.6%.

## Clearing House Section Outstanding Used Equipment Values

Over one hundred individual advertisers feature an exceptionally large selection of used equipment in the 13-page "Clearing House" section which starts in this issue on page 110. Readers will find the "Clearing House" a dependable and informative directory of outstanding values in used equipment and we suggest that you make perusal of these pages a regular habit each month. At any time that you have equipment you wish to sell, anywhere in the country, we suggest that you present your offerings in our "Clearing House." This section is growing faster, getting larger every month, because it's doing a better, quicker selling job—at one low cost!



★ (Left): Plus  $\frac{1}{8}$ -in. material in windrows and boxed before application of SC-4 road oil, route 58 near Holden, Mo. (Right): After application of 10 gal. per ton of SC-4, mixed and flattened out before application of minus  $\frac{1}{8}$ -in. material

## Road-Mixed Bituminous Mat Built With Two Stone Sizes

"Plus one-eighth" and "minus one-eighth" material was combined on this test project to produce an economical and satisfactory mix

**By G. B. Major**

Division Maintenance Engineer, and

**E. H. Logan**

Division Materials Engineer,  
Missouri State Highway Department,  
Kansas City, Mo.

THE Missouri state highway department's maintenance staff experimented in 1948 with two-size stone in 9.8 miles of bituminous mat on Route 58 Johnson County. The new mat consisted of a  $1\frac{1}{4}$ -in. layer built on an existing mat. All the work was performed with maintenance men and equipment. The purpose of this experiment was to determine the effect of the minus-50-mesh size by field observations of mixing and the quantity of oil required. To keep the quantity of minus-50-mesh constant, the stone was purchased in separate fractions or sizes.

The stone company's crushing plant being near the work, all stone was trucked and spread direct in windrows on the job.

The SC-4 road oil was supplied in tank cars on railroad sidings adjacent to the work. A tank car booster reheated the road oil to 200 degrees F. for pumping into maintenance pressure distributors. The road oil was applied at about 210 degrees F.

### Normal Separation Found

Gradation analyses of the stone plant's production were made to find the normal separation of the two sizes of stone. Since this plant furnishes agricultural lime whose maximum size is  $\frac{1}{8}$ -in., this size was selected as the separation point. From these analyses it was found that 80%  $\frac{1}{8}$ -in.-plus and 20% minus  $\frac{1}{8}$ -in. material, when combined, would furnish a graded stone meeting the standard specifications for bituminous mat.

The average washed gradation anal-

ysis of plus  $\frac{1}{8}$  at the stone plant's bins was as follows:

Passing $\frac{1}{4}$ in. screen.....	100 %
" 1 " " .....	99.9 "
" $\frac{1}{2}$ " " .....	76.2 "
" $\frac{3}{4}$ " " .....	39.4 "
" $\frac{1}{8}$ " sq. sieve.....	16.8 "
" No. 10 mesh sieve.....	6.8 "
" No. 20 " " .....	3.4 "
" No. 50 " " .....	1.7 "
" No. 100 " " .....	.8 "
" No. 200 " " .....	.4 "

The plus  $\frac{1}{8}$ -in. stone was placed first in windrows on the road at the rate of 10 tons per 100 lin. ft. It was bladed and boxed to even and to obtain the desired quantity per linear foot. Some fines from the shoulders were bladed into this windrow, so a washed analysis was made of samples taken from this windrow. The average grad-



★ Truck repeatedly spread thin applications of minus  $\frac{1}{8}$ -in. material on top of the coarser material, until load was dispersed

ation analysis was as follows:

Passing 1 1/4 in. screen.....	100 %
" 1 " " .....	99.5 %
" 1/2 " " .....	56.0 %
" 1/4 " " .....	27.4 %
" 1/8 " sq. sieve .....	15.2 %
" No. 10 mesh sieve.....	7.9 %
" No. 20 " " .....	5.9 %
" No. 50 " " .....	5.0 %
" No. 100 " " .....	4.5 %
" No. 200 " " .....	4.2 %

The 80-20 proportions were not changed.

The windrow was then flattened by a motor grader for the width of 10 ft., which would allow the pressure distributor to apply the SC-4 oil in one pass. The first application of SC-4 was then made at the rate of 6 gal. per ton of stone. After some manipulation with motor graders a second application of 4 gal. per ton was placed over the flattened windrow. Two motor graders then manipulated the windrow until the 10 gal. per ton coated the plus-1/8-in. stone.

Again the windrow was spread out and lime trucks, with their discs disconnected, spread 2.5 tons of minus-1/2 stone per 100 lin. ft. The average washed analysis of the minus-1/2 at the bins was as follows:

Passing 1/2 in. screen.....	100 %
" 1/4 in. sq. sieve .....	98.5 %
" No. 10 mesh sieve .....	92.7 %
" No. 20 " " .....	64.6 %
" No. 50 " " .....	35.4 %
" No. 100 " " .....	24.7 %
" No. 200 " " .....	20.3 %

Very even distribution was obtained by the trucks repeatedly spreading over the measured distance until the load was dispersed. A revolving tooth harrow followed the lime trucks, mixing the dust down through the plus 1/2 material. This resulted in coating the coarse particles with the dust, instead of the dust grabbing the oil and

★ (Left): Motor grader in distance is mixing plus-eighth and road oil, after second application, Route 58. (Right): Seaman pulvimixer at work on oil mat resurfacing on Route 45, Platte County, Mo., following second application of MC-3 with two stone sizes.



forming rich balls of dust and road oil.

### Third Oil Application

The third application of SC-4 road oil 3.2 gal. per ton of total aggregate, was mixed thoroughly by cutting the windrow in half. The windrows were further manipulated with the harrow and motor graders. Final blading and rolling out leveled out the mat to a crowned thickness of 1 1/4 in. and for a width of 20 ft.

Equipment used on this experimental job consisted of a booster heater, one 800-gal. bituminous pressure distributor on a two ton truck, four 50-hp motor graders, one 75-hp motor grader, one revolving tooth harrow, one 20-hp wheel tractor and one 5-8 ton tandem roller.

While costs for labor and equipment rental ran somewhat higher than for comparable jobs built with one size stone, there was increased efficiency in mixing and also a saving of 20% in bituminous material, as all particles of stone could be coated using less asphaltic material than had been

previously used with the same gradation of one size stone.

This job had been originally estimated for approximately 110,000 gal. of SC-4 road oil but the mixing and tacking of the old surface required only 88,990 gal. of oil or 13.1 gal. per ton of stone.

### Small Sheepfoot with Dozer


You don't often see one sheepfoot roller drum on an axle these days, especially a small "pony" size such as S. J. Grove & Sons Co. of Minneapolis is shown using here with the Caterpillar dozer. This equipment was employed on a very wet, silty river-bottom grading job of 140,000 cu. yd. for a bridge approach on Highway 61 near Hastings, Minn. The dozer here is making an access road, and a little extra rolling to get good haul road conditions was performed as the tractor went about its work.

### Virginia's Road Objectives

The Virginia state highway commission's 6-year highway program, now in its fourth year, has these definite objectives: (1) widen and strengthen every remaining one-lane or weak bridge in the primary system; (2) put hard surface on all primary links not now so surfaced; (3) eliminate "accident prone" spots and sections; (4) concentrate on widening and strengthening substandard gaps in the major routes; and (5) bring up to heavy-duty standards all important through truck routes.

The estimated cost of this 6-year program for rural construction is \$114,000,000. The Commission believes the program will result in better coordination and preparation of plans and surveys, and economies and increased efficiency in maintenance and right-of-way acquisition.





# Fighting Western Blizzards

**What happened in the western plains and intermountain states last winter . . . How the highway departments, army engineers and other public agencies aided by contractor organizations joined forces to keep roads and streets open . . . Lessons for the future.**

**A 15-page special report, marking the start of a new monthly series of "Roadbuilders at Work" reports or symposiums on timely topics in highway construction, maintenance and heavy construction**

**L**AST winter while the Eastern U.S. basked in unseasonable warmth, a million square miles of the West lay in the grip of sub-zero blizzards without precedent in prolonged length, number and fury.

While Pennsylvania's idle snowplows rusted in the yards, Western highway transportation was at times completely paralyzed, as highway departments joined forces with all available agencies, public and private, to save livestock, rescue stranded motorists and restore some semblance of highway service.

What happened? How well did the state highway departments succeed in meeting this severest of all tests to date? What equipment was employed and how did it perform? What other agencies took part and what was their contribution? What conclusions can be drawn at this time?

In short—what is the picture, now that the "gee whiz" period is past and those who took part can look back soberly? Truly, it was one "hell of a winter." Many more weeks must pass before authorities can assay the damage in full, write down all their experiences and analyze them for the future. The West is only a century old since the gold rush. It is only three decades old, motor transportation wise. Highway transportation is so highly developed

*(Continued on page 59)*

## ROAD BUILDERS AT WORK

**No. 1 of a monthly series of special  
"Roads and Streets" presentations**



# The Big Rescue

★ This is the "atmosphere" of the blizzard. Rotary is widening a drift on Colorado 113, near Peetz during the last day of the January storm. Bucket of the power shovel, used to open this highway, seen at lower right

**By Wallis M. Reef**

Director of Publications and Reports,  
Colorado State Highway Department

**T**HE wind carried only a light burden of fine snow, but Al Jensen decided to play safe. In the ten years he had been a patrolman for the Colorado State Highway Department he understood the wisdom of keeping the highways clear at the beginning of a storm.

Al called his helpers, Ed Staley, Carl Haworth and Joe Sullivan, who lived at Nunn, 20 miles north of Greeley on U.S. 85, and the four started out in two four-wheel-drive 5-ton trucks on which had been mounted 40-inch reversible blade plows.

In many places, the wind was sweeping the pavement clean. At others, the fine snow was starting to drift behind fence posts and other obstructions. But the drifting was not serious. It was Sunday afternoon, January 2, 1949. Al and his helpers assumed they were

*This dramatic account of highway worker heroism in time of disaster happens to be confined to Colorado. Similar stories could be told of the valor and courage of personnel of other Western highway departments, the Corps of Engineers, contractors' crewmen and other agencies*

going on another routine patrol of the 25 mile section of highway which was their responsibility under the Colorado patrol system. Instead, however, they were starting out to play desperate parts in what was probably the greatest rescue mission in Colorado history. A mission that was to cover nearly 40,000 square miles in an area almost 200 miles square; that would see more than 400 persons saved from frigid death, that would involve the heroic efforts of 200 highway department employees and the use of virtually every known type of snow removal equipment, and even Air Force planes and snow weasels. Five persons were to perish, four of them members of one family.

## Real Trouble Begins

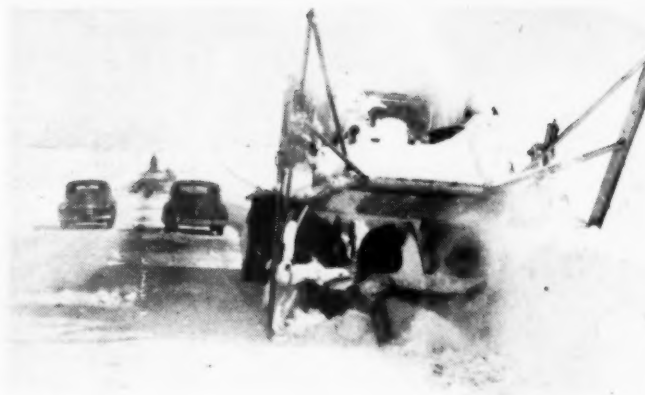
When Al Jensen and the others started out, their purpose was merely to keep the highway open, a not too difficult task at the moment.

Within a short time, however, the wind increased. A ground blizzard whipped the snow across the highway in a 50 to 60 mile-an-hour gale. It had the appearance of a stream flowing at a terrific pace, and its onslaught was a solid, punishing impact. Windshields became so caked with ice that the wipers were useless. The temperature dropped to zero and continued downward. Although it was afternoon, it was impossible for the men to see the fronts of their own trucks even by leaning out the open windows.

Drifts began swirling across the highway, piling up so rapidly that they filled in and mounted higher as soon as



★ This scene is on U.S. 85, near Rockport. All occupants of the two buses and the cars which are stalled had to be transported to safety, the type of work in which Al Jensen and his men engaged. During the storm it would have been impossible for the occupants of these cars to see the other vehicles



## Motor Graders with Rotaries Performed Well

★ In Colorado among other Western states last winter considerable use was made of Adams motor graders equipped with rotary or V-plows. An Adams Model 610 motor grader with Adams Rotary Snow Plow was used to clear the road up Mt. Evans to elevations of 11,000 to 12,000 ft. Pictured

here is a unit of this type at work last winter on U.S. 40 near Craig, Colorado. The rotary is powered independently by two International 90 hp. 450 engine units, coupled through multiple V-belt drive to the blowers. At right is a truck-mounted Bros rotary on Colorado U.S. 40 near Craig

the plows had pushed their way through. Although the snowfall would have been but a few inches deep on the level, drifts were piling up.

Jensen and his men soon found a car stuck in a snowbank that had drifted across the road within a few minutes. The motorist was accompanied by his wife and two children. In desperation he had attempted to put on chains, but had succeeded only in nearly freezing his hands and face and in exhausting his strength. Deadly fear stared at Jensen as he forced open the car door.

With the aid of his helpers, Jensen transferred the motorist and his family to the cabs of their trucks and took them to Rockport, the nearest place of

shelter about five miles away. The rescue mission had begun.

Through Sunday afternoon and Sunday night, the four men plowed into the drifts, removed the occupants of cars and took them to safety. Cars, trucks and buses were stalled every few hundred yards along the highway, one of the main routes between Denver and Cheyenne.

### Trouble Continues

They were able to liberate a few of the buses and trucks, and these, following the plows, aided in transporting the victims of the storm to Rockport. Rockport consists only of one building constructed of stone. It has

one large room designed as a cafe and dance hall. Before the storm cleared, more than 400 men, women and children were crowded into this structure and some remained there for four days.

All day Monday and Monday night, Jensen and his men kept their plows in operation, snatching an occasional bite to eat but getting virtually no sleep.

Early Tuesday they believed they had removed all the occupants of stranded cars north of Rockport, and they proceeded south, toward Lone Tree upon receiving word that cars were stuck in drifts in that locality.

The two plows assisted a Greyhound bus to plough through the drifts and



★ (Left): Sno-Go with FWD truck widening U.S. 36, west of Anton, Colorado, after opening with V-plow. The snow looks black just over the top because it has been covered by sand which the high winds dug out of the frozen ground



(Photo Colo. H.D.). (Right): V-type plow takes a second "pass" at drift which it previously had smashed through. Blade plows follow, clearing away the small drifts. U.S. 36, west of Anton, Colo.



★ A bird's-eye picture of last winter's freakish weather compiled from U.S. Weather Bureau data

pick up occupants of several cars. The bus driver was unable to see the road because of the storm, and Jensen walked ahead of the vehicle, staggering against the blizzard and stumbling through drifts so the driver might proceed by following him.

At Lone Tree the bus stalled. Jensen attempted to remove the battery from the bus in an effort to start one of the snowplows, but ice froze over his face. Tuesday afternoon the other plow became locked in the icy grip of a huge drift.

Similar activity was going on in the entire northeastern part of Colorado. All roads were closed, including U.S. 87 to Fort Collins, U.S. 85 south of Greeley, U.S. 6, 34 and 138 leading to Nebraska and U.S. 36, 24 and 40 leading to Kansas. More than 200 highway department employees, including shop men, extra men, everyone available, were battling the blizzard night and day. Men worked until they virtually dropped in their tracks.

Ordinarily, Sno-gos are not considered necessary for opening roads on the plains country in northeastern Colorado, but on Tuesday, state highway engineer Mark U. Watrous and Douglas N. Steward, veteran maintenance engineer, had rented a rotary from the National Park Service and had thrown another into the fight from Loveland Pass, 70 miles west of Denver.

About 6 o'clock Tuesday evening, district engineer Harvey Stitt, directly in charge of the operations of maintenance superintendents Darrel Vail of Greeley and Charles Kempf of Denver, who were personally leading their men in the field, flew over the Rockport area in a plane provided by the Air Force Rescue Unit at Lowry Field, near Denver.

Thirty cases of army rations and 150 blankets were dropped at Rock-

#### Rural Highway Mileage in the Western Range States

	State Controlled	County and Local Controlled Surfaeed	Nonsurfaeed	Total
Arizona .....	3,797	3,067	12,541	19,405
Colorado .....	11,818	6,149	63,162	81,129
Idaho .....	4,966	11,745	24,918	41,629
Montana .....	8,615	9,328	45,964	63,907
Nebraska .....	8,815	18,698	72,808	100,321
Nevada .....	5,616	904	17,325	23,845
North Dakota .....	6,764	17,488	89,859	114,111
South Dakota .....	5,860	21,634	69,795	97,289
Utah .....	4,744	4,167	11,260	20,171
Wyoming .....	4,334	1,294	19,310	24,938
GRAND TOTAL .....	65,329	94,474	426,942	586,745
Kansas .....	9,390	92,839	27,273	129,502

port and Stitt spotted Jensen and his patrol crews south of Rockport.

After smashing through drifts all Tuesday night, the Loveland Pass Sno-go and a "V" plow reached Rockport Wednesday morning. They were followed by a gasoline transport truck, to supply gasoline to stranded cars, and by a bus to remove the ill or injured to Greeley.

In attempting to reach two stranded buses on U.S. 36 near Joes, the biggest trucks and plows fought their

way to Anton, four miles west of Joes. There they encountered drifts 20 feet high. It took all Tuesday afternoon and all of Wednesday night to smash through the four miles to Joes. On Colorado 113, near Peetz, it was necessary to use a power shovel to remove a drift 35 feet deep.

The Department continuously warns winter motorists to stay in their cars if stalled on any of the primary highways either in the mountains or plains. Keep warm, but leave the window open a little if the heater is turned on, is the caution. Before many hours, as a result of the patrol system, a highway crew will come along. All five of those who died in the storm in Colorado had left their cars and had attempted to find shelter.

Snow weasels and similar equipment were used by the Air Force Rescue Unit during the storm, and the Colorado state patrol has now purchased three "snow cats" in the event of future storms.

The blade plows of the Highway Department are mounted on FWD or Coleman four-wheel drive, 5 to 7 ton trucks. Nearly 100 such trucks, equipped with reversible blades or V-type blades—Wausau Bros or Ross were used. A number were equipped with 12-foot Ross snow wings.

A number of graders were equipped with Shunk sawtooth blades.

Capt. Sherman W. Neilson of the

Colorado state patrol wrote state highway engineer Watrous: "Only through the heroic efforts of men in your department was a terrible tragedy averted during the blizzard. I know how hard they worked and how loyal they were, because I was there."

"Every one of the men of the highway department who participated in this tremendous rescue mission risked death or serious injury," said Watrous. "To each one is due the highest possible praise."



★ (Left): 30-foot drift on Colorado 113, near Peetz, opened by a power shovel, a rotary and V-type plows. (Note height of pole in relation.) (Right): Same drift seen at left covered this roadside home and trapped Roy G. Larson and his family for two days, until neighbors dug a tunnel, in which the family is standing

## Fighting Western Blizzards

(Continued from page 55)

today, and so vital, that when it freezes to a trickle or stops even for a few hours or days, the economic loss runs into millions.

Like peak-flood intervals for which bridges are designed, road maintenance and plowing work must be designed for some sensible peak winter. Admittedly, the highway departments should not equip for once-a-century winters. But authorities agree they should prepare for occasional winters, and have a Disaster Plan for any recurrence of winters such as the last.

### General Area Picture

The state highway departments, with some 3400 powered equipment units and 2600 miles of snow fence, were fairly well prepared last fall for the usual storms.

The first storm came in Nebraska, Nov. 18, and then Dec. 29 came a heavy, widespread western snowstorm, winds and low temperatures. Men and machines worked around the clock to keep the roads open and wheels rolling with the necessities of life. State highway department effort was confined to the opening of state highways carrying the heaviest traffic, being restricted both by state law and by the fact that they were only equipped to maintain the state highway mileage. The county and local authorities struggled with the large local mileage, for much of which it has never been the practice to plow clear of light snowfalls. In fact, nature provides wind-swept areas during light snowfalls and low velocity winds which give livestock grazing space.

With the state highway forces occupied from the Dec. 29 storm and some of the equipment in need of servicing, on Jan. 2, another storm of unusual severity came over parts of, or the entire areas of, each of the 10 states eventually declared in the disaster area. It also covered parts of Kansas and Oregon. The storm, lasting three days, was accompanied by wind velocities up to 70 mph. The wind was so high that snowfence often cast drifts right on the road.

On Feb. 6 a new storm moved in with zero readings. Wind reached 70 mph. in the Casper-Rawlins-Tusk area of Wyoming; reached 50 to 60 mph. in western Nevada.

On Feb. 9 blizzard conditions again existed in the western area of South Dakota, which hampered operations. Highway department employees were forced to wait for a slackening of the 40-mph. wind to resume operations.



★ Scenes like this were common. Here a Bureau of Reclamation motor grader with V-plow is leading a procession of hay trucks, north of Rawlins, Wyoming, Jan. 16

Acme Telephoto

A storm was reported at Ely, Nevada, on Feb. 11 and a 45-mph. wind was causing bad drifting. . . . On Feb. 12 highway travel ground to a stop in North and South Dakota. . . . Main roads were closed on Feb. 14 in Wyoming; again winds were up to 70 mph. . . . On Feb. 15, more main roads were reported blocked in Utah than at any time during the winter. . . . Fresh snow blew and reblocked roads in northwest North Dakota on Feb. 15. . . . On Feb. 16 high winds were again prevailing from 30 to 60 mph. around Rawlins, Wyoming; 12th day this area was isolated. . . . Feb. 17, severe winter conditions with sub-zero weather continued in North Dakota. . . . Week ending March 5, in North Dakota, continued with temperatures from 5 to 30 degrees above zero and drifting winds.

### Emergency Measures Began

With this background of weather, with state highway departments straining to keep state highways open, and with highway officials responsible for county and local roads not being equipped or financially able to clear roads to isolated farm and ranch areas, requests started to pour into the offices of the various governors for assistance. During the week of Jan. 17, requests for Federal assistance started to appear in the offices of members of Congress. In the meantime, Federal agencies owning equipment responded to requests for aid from the states.

On Jan. 25 a U.S. Senate committee, under the chairmanship of Senator O'Mahoney of Wyoming, held a hearing on Joint Resolution 38 to approve the action already taken by individual federal agencies and to authorize further federal relief. This resolution authorized the U.S. Bureau of Land Management, Bureau of Reclamation and other federal agencies to break through snow-bound areas in the Western range states, and to

take necessary action in human and livestock relief. It authorized a sum not to exceed \$500,000 for the work.

The President, in the meantime, had appointed General Philip Fleming, Federal Works Administrator, as Federal Coordinator for the Snow Disaster Area. On Jan. 26 the Coordinator met with federal agencies in Washington, D. C., and organized the relief. He then made a personal field inspection of the disaster area to make certain the relief was forthcoming.

District engineers of the Public Roads Administration and the Bureau of Community Facilities, under the Federal Works Agency, compiled lists of contractors having available equipment and took an active part throughout the emergency.

Preliminary estimates indicate that the federal government probably expended about \$13,000,000 in the relief work. Ten state highway departments expended about \$9,000,000, or about \$5,400,000 above normal winter snow removal costs. Additional sums were expended by counties, cities and other local governmental agencies. The spring pavement damages, which may result from the oversaturation of pavement bases from melting snow, are not yet fully known.

Emergency legal action was also taken by several of the states. The Wyoming and Nebraska legislatures each voted not to exceed \$500,000 for a state-wide disaster fund. South Dakota voted a special fund of \$100,000. In North Dakota the governor declared an emergency and authorized the state highway department to use equipment off the state system. A special session of the Utah legislature is contemplated at this writing, to tackle highway problems sharpened by the winter.

What is not generally realized is that throughout the emergency period the state highway departments han-

dled snow removal on the state highway systems, where the bulk of traffic moved, and no federal relief was furnished for this purpose. The federal relief was confined to county and other local roads where the local agencies were not equipped to handle the work.

### Non-Highway Agencies

Before reviewing details state by state, it might be well to pause here and take our hats off to the various agencies who cooperated. Their part will be mentioned in the state summaries, but in particular mention should be made of the Corps of Engineers and the contractors.

The army engineers went into action, working out of Chicago and Omaha. With major general Lewis A. Pick, (now chief of engineers) as field commander, this agency mobilized its own and its contractors' equipment and men into the much-publicized "Operations Snowbound." Many hundreds of units, running heavily to tractors with dozers, were thus put to work on county roads and other operations supplementing state highway department forces.

Army operations, which took in much of the 10-state area at times, also included cargo plane delivery of livestock feed and other cooperation from the air forces. The railroads co-operated splendidly, by the way, the Burlington, for example, delivering 19 carloads of equipment from Colorado to South Dakota.

Private contractors' offers of as much as 675 pieces of equipment flooded into Omaha, according to one January news dispatch, and eventually much contractor equipment was sent long distances, sometimes complete with personnel. Hundreds of contractors and equipment distributors furnished equipment for local use. Among the firms which went all-out, to name a few, are Martin Wunderlich Co., of Denver, which made its big fleet on Cherry Creek Dam [April '49 R&S] available for shipping where needed; Peter Kiewit, of Omaha, Denver and elsewhere, likewise made equipment available in the pool being formed. These two firms sent 90 carloads by rail to distant points, accompanied by repairmen, shop equipment, operators and supervisors.

Local AGC contractor association chapters did much to help. From Kansas City, Mo., 25 large contractors and 50 smaller ones furnished 340 units to the army engineers, including some nearly new machines. Here, too, complete "outfitting" accompanied. In Wyoming, contractors in February furnished 48 bulldozers, 15

graders, several flatbeds and other units for opening ranch roads. Nevada contractors sent 20 dozers, and flew parts when needed. South Dakota contractors responded with nearly two hundred units. In Nebraska the first call brought out 30 to 40 contractor fleets and crews, mostly with dozers.

The Harlan County Contractors in Nebraska, S. J. Groves in Minneapolis, and contractors on the big Garrison and Fort Randall dams in North and South Dakota also aided, as did the labor unions involved throughout the area, incidentally.

### Arizona Didn't Escape

Following are notes on the storm experiences and opinions or conclusions from highway engineers of authority who were out in the weather. Of necessity these notes are informal, but their very informality gives a candidness and freshness to the reporting that should make this article valuable as a reference.

Sixty-mile winds repeatedly swept into northern Arizona, and for a few hours at a time drifts closed US 66,

main E-W arterial. Clearing arterials was not the big problem, however. More difficult was the getting of hay to cattle and food supplies to ranchers and Indians over rutted ranch roads and reservation trails. "Weasel" drawn sleds or toboggans were employed, and all available maintenance equipment used. Tractors with dozers were shipped from reservations farther south. Almost continuous use of a rotary plow was required for US 89 northeast of Flagstaff.

### Colorado's January Blow

Colorado weather was bad over a shorter period, and not all the state was hit by disaster conditions. Although the January storm was extremely severe ["The Big Rescue" in this issue], by February conditions had been relieved. Highway department winter costs totalled \$427,000, 50% over normal.

In general the state and county highway forces were fairly well equipped, since severe winters are steady fare in the high mountain country. The state highway department began in February to acquire

January 1949 Weather Compared with Other Januarys and 1949 A

	Temperature (°F)										Average Jan. 1949	Departure from normal	
	Average for Jan. 1949	Departure from normal	Coldest Jan. of record		Extreme lowest			Number days in January with					
								Freezing		Zero or below			
			Average	Year	Jan. 1949	Any Jan.	Year	1949	Norm.	1949	Norm.	Average Jan. 1949	Departure from normal
<b>Pacific Area</b>													
Seattle, Wash.	33.6	- 7.2	31.0	1916	20	3	1893	26	8	0	0	1.43	-3.0
Spokane, Wash.	8.5	-18.9	8.5	1949	-15	-30	1888	31	26	18	2	0.30	-1.0
Medford, Ore.	29.6	- 8.3	26.9	1937	5	- 3	1930	31	18	0	0	0.51	-1.0
Sacramento, Calif.	39.4	- 6.4	38.7	1937	22	19	1888	24	4	0	0	1.47	-2.0
Los Angeles, Calif.	46.8	- 7.8	46.8	1949	28	28	1949	4	1	0	0	2.43	-0.0
<b>Inter Mountain</b>													
Helena, Mont.	0.6	-18.1	-2.4	1937	-34	-42	1893	31	28	24	8	0.66	+0.0
Boise, Idaho	10.3	-17.6	10.3	1949	- 7	-28	1888	31	25	16	1	0.12	-1.0
Salt Lake City, Utah	11.6	-15.9	11.6	1949	-22	-22	1949	31	29	15	2	2.31	+1.0
Cheyenne, Wyo.	14.1	-11.4	12.2	1875	-16	-38	1875	31	29	13	4	2.78	+2.0
Denver, Colo.	19.4	-10.4	16.9	1930	- 7	-29	1875	31	27	9	3	1.46	+1.0
Phoenix, Ariz.	44.6	- 6.6	43.2	1937	24	16	1913	10	5	0	0	1.61	+0.0
El Paso, Tex.	36.1	- 7.5	36.1	1949	8	- 6	1948	19	16	0	0	1.84	+1.0
<b>Great Plains</b>													
Bismarck, N. Dak.	2.5	- 3.8	-0.2	1875	-33	-45	1916	31	31	21	17	0.74	+0.0
Rapid City, S. D.	8.8	-11.2	6.0	1937	-25	-33	1916	31	29	20	8	1.68	+1.0
North Platte, Neb.	11.6	-11.3	6.4	1875	-15	-35	1888	31	31	16	6	1.98	+1.0
Dodge City, Kan.	21.6	- 7.4	13.0	1875	- 3	-20	1883	31	29	3	3	1.96	+1.0
Kansas City, Mo.	26.0	- 2.2	12.8	1940	- 2	-20	1912	26	25	2	2	3.22	+3.0
Ft. Worth, Tex.	39.1	- 5.3	34.9	1940	- 2	- 2	1949	21	9	1	1	3.45	+3.0
San Antonio, Tex.	46.5	- 5.8	43.2	1930	0	0	1949	10	5	1	0	2.91	+1.0
Brownsville, Tex.	59.0	+ 0.2	51.6	1875	23	18	1881	3	1	0	0	0.39	-1.0
<b>Northeastern Quarter</b>													
Marquette, Mich.	22.4	+ 6.1	1.3	1912	- 3	-26	1881	30	31	2	1	2.11	-0.0
Chicago, Ill.	28.4	+ 6.1	11.9	1912	- 4	-20	1897	26	27	2	4	3.32	+1.0
Detroit, Mich.	31.6	+ 7.5	13.0	1912	4	-16	1918	26	28	0	2	2.74	+0.0
Cincinnati, O.	40.7	+ 8.4	16.3	1918	8	-16	1936	11	22	0	1	9.60	+6.0
Buffalo, N. Y.	31.2	+ 7.3	14.1	1918	8	-14	1884	25	27	0	1	2.71	-0.0
Boston, Mass.	34.6	+ 6.7	20.1	1888	14	-13	1882	21	26	0	1	3.21	-0.0
New York, N. Y.	39.0	+ 8.1	21.6	1918	18	- 6	1875	18	24	0	0	5.63	+1.0
<b>Southeastern Quarter</b>													
Washington, D. C.	43.4	+10.0	23.7	1918	19	-14	1881	9	22	0	0	5.08	+1.0
Raleigh, N. C.	50.3	+ 9.2	30.8	1893	27	- 2	1893	5	15	0	0	2.66	-1.0
Atlanta, Ga.	51.8	+ 9.3	29.6	1940	27	- 2	1886	6	12	0	0	4.57	-0.0
Memphis, Tenn.	45.6	+ 5.9	27.2	1940	10	- 8	1918	9	13	0	0	8.87	+4.0
New Orleans, La.	61.2	+ 7.0	43.0	1940	30	15	1886	2	2	0	0	3.26	-1.0
Jacksonville, Fla.	63.4	+ 8.0	45.5	1940	32	15	1886	1	2	0	0	1.46	-1.0
Miami, Fla.	71.0	+ 3.1	61.3	1940	41	29	1905	0	0	0	0	0.14	-2.0

\*Less than 1

new equipment totaling \$400,000, and is believed to be in position to render some emergency aid to counties in the future.

Following are excerpts from a report dated Feb. 11 for Colorado.

"Conditions prevailing in the four eastern counties (Larimer, Weld, Logan and Sedgwick) are quite different from those found in the western counties. In these plains counties the snowfall ranged from 12 to 18 in., but due to the high winds most of the fields were blown clear, and the snow drifted along the fence lines, around houses or clumps of trees.

"Weld County has 30 V-plows on motor patrols, 3 FWD trucks with V-plows, 3 D7 tractors and dozers, 9 tractors and dozers rented, and one rotary plow on an Adams grader. Ninety county employees are engaged in snow removal work, as well as 27 men operating 9 rented dozers. For 10 to 12 days operations were on a 24-hour basis. January cost \$87,000.

### Contractors Were Fickle

"When the storm reached disaster proportions in Wyoming and Nebraska, 5 of the rented tractors and dozers left Weld County for work with the U.S. Engineers at a higher rate of pay. Approximately

## Approximate Estimated Cost of Winter's Work and Spring Damage

Western state highway departments (department expense only)  
No reports received for Arizona or Wyoming

State	Plowing and Sanding Past Winter	Previous Winter	Costs 5-year Average	Spring Repairs to Roads and Bridges This Year	Probable Extent of Construction Curtailment in '49
Idaho	\$ 550,000 <sup>(1)</sup>	\$297,162 <sup>(2)</sup>	\$288,000 <sup>(3)</sup>	\$1,820,000	\$1,000,000
Kansas	850,000	449,535	264,926	Not expected to be severe	None
Montana	730,000	477,677	300,625	1,000,000	250,000
Nebraska	1,500,000	229,728	136,125	250,000	150,000
Nevada	270,000	103,000	80,000	600,000	500,000
North Dakota	1,000,000	818,635	507,220		
South Dakota	1,060,000		207,350 <sup>(3)</sup>		
Utah	1,300,000 <sup>(4)</sup>				

<sup>(1)</sup> 1,600,000 for all agencies incl. sta. hy. dep.

<sup>(2)</sup> Calendar years 1947

<sup>(3)</sup> Last 5 calendar years

<sup>(4)</sup> Including federal aid

<sup>(5)</sup> Ave. for previous 3 winters

<sup>(6)</sup> Including all agencies including sta. hy. dep.

500 miles of roads in northeastern Weld County have not been opened, but trails exist through fields so that residents may reach the market centers and can feed the livestock. Some schools have been closed for 5 weeks.

"The highway department maintenance organization in this area (Div. 1) consists of 62 men on patrol plowing and 8 men on rotary plows. Operations were on a 24-hour basis for 10 to 12 days. This division has 36 3½ to 5-ton trucks, 5 V-plows, 42 reversible blade plows, 2 rotaries (temporary) and 2 5-ton trucks that accompany rotaries. No equipment was disabled during the storm for lack of parts."

### Idaho's Worst Winter

The Idaho highway department's cost was about \$750,000 for the past winter (April estimate), nearly double recent years. The state had several November storms, with icy roads. All through January and February equipment ran on a 24-hour basis, and a great number of units, principally dozers, were rented. Little state highway assistance could be rendered local authorities.

However, the state benefited greatly from the availability of much new equipment for clearing arterials. During the past two years the highway department had purchased 54 heavy trucks, 8 rotary plows, 43 blade plows and 22 V-plows and wings, costing \$263,000. Also 9 new motor graders, a tractor and several new power units on snow equipment for an additional \$140,000. This equipment for the most part replaced old worn-out units. By March 8, all arterial routes normally plowed were in service.

Relief work in Idaho was handled directly by the governor, leaving the highway department free to concentrate on the arterials. As of Feb. 18, US 30 was blocked between Rupert and American Falls; state route 15 was blocked in the Payette River Canyon; US 20 was closed between Arco and Blackfoot and elsewhere; US 95 was intermittently in distress.

The snow on US 30 was reported to be 28 ft. deep at one point, and packed so hard that rotary plows were unable to work. "An attempt will be made to blast this drift with powder," stated a report, "to at least loosen it to a point where rotaries can open."

Flying box cars delivered coal to Arco, and requests besieged the governor's office for relief in other isolated communities. But there were few requests for transportation of feed for stock.

Financial red tape in Idaho illustrated the need for better procedures for financing and carrying out disaster programs. No agencies could tell what funds had been spent for what, and what percentage was

## 1949 Accumulated Snowfall to March 31, at Selected Cities

days in y with		Precipitation (Inches)				Snowfall (Inches)				Snow on Ground (Inches)				Wind M.P.H.	This Winter's Snow- fall to March 31, 1949 (Inches)		
		Average Jan. 1949	Departure from normal	No. days with precipitation		Total Jan. 1949	Norm.	Greatest		No. days with snowfall Jan. 1949	Greatest depth				Highest speed Jan. 1949	Total	Departure from normal
				Jan. 1949	Norm.			Jan. total	Year		Jan. 1949	Any Jan.	Year				
1949	Norm.	1949	Norm.	1949	Norm.	1949	Norm.	1949	Norm.	1949	Any Jan.	Year	1949	Total	Departure from normal		
0	0	1.43	-3.51	9	18	7.0	4.6	23.3	1916	6	2.2	17.0	1899	38	20.0	+ 9.0	
18	2	0.50	-1.66	9	14	6.4	11.3	36.0	1937	8	19.0	21.0	1937	36	70.3	+35.0	
0	0	0.51	-1.80	4	13	5.1	3.0	22.6	1930	4	3.0	10.3	1930	27	16.1	+10.8	
0	0	1.47	-2.25	4	10	T	T	4.0	1888	0	0	4.0	1888	27	T	0	
0	0	2.43	-0.67	11	6	0.3	T	2.0	1932	1	0.3	1.0	1932	41	0.3	+ 0.3	
24	8	0.66	+0.10	9	9	13.8	10.0	35.4	1884	13	11.0	17.3	1943	27	52.4	+ 5.1	
16	1	0.12	-1.61	4	11	4.3	8.3	27.0	1929	6	3.0	14.8	1912	31	48.8	+25.1	
15	2	2.31	+1.33	15	10	30.1	12.4	33.6	1937	15	23.0	23.0	1949	29	88.2	+44.1	
13	4	2.78	+2.36	8	6	15.1	5.4	20.3	1891	8	16.0	16.0	1949	66	64.9	+17.9	
9	3	1.46	+1.06	10	5	22.2	5.8	20.5	1883	10	10.0	16.7	1914	30	52.7	+ 8.7	
0	0	1.61	+0.81	10	4	T	T	1.0	1933	0	T	1.0	1933	26	T	0	
0	0	1.84	+1.38	5	3	8.3	0.8	8.3	1949	3	4.0	4.5	1906	48	8.3	+ 6.0	
21	17	0.74	+0.29	11	7	11.8	5.5	14.7	1907	12	9.5	16.3	1907	50	29.7	- 0.9	
20	8	1.68	+1.23	12	6	24.0	4.6	24.0	1949	12	14.0	17.4	1944	73	35.7	+ 9.2	
16	8	1.98	+1.59	12	5	21.6	3.6	21.6	1949	13	18.0	18.0	1949	50	57.2	+34.4	
3	3	1.96	+1.55	10	4	10.3	3.3	19.7	1898	9	3.0	9.0	1932	45	28.7	+10.7	
2	2	3.22	+3.98	11	7	13.7	4.6	22.2	1930	8	8.1	15.3	1930	29	26.8	+ 6.7	
1	1	5.45	+3.40	15	7	3.5	0.9	8.2	1917	3	2.9	8.2	1917	..	3.5	+ 1.0	
1	0	2.91	+1.45	15	8	4.7	0.2	6.4	1926	1	4.7	6.0	1926	36	4.7	+ 4.4	
0	0	0.39	-1.42	8	8	0	T	T	1924	0	0	T	1924	34	0	.....	
2	1	2.11	-0.22	17	17	20.7	23.1	50.0	1918	13	20.0	48.6	1911	25	74.5	-24.7	
2	4	3.32	+1.42	14	11	0.5	9.1	42.5	1918	4	0.2	24.7	1918	36	13.5	-18.6	
0	2	2.74	+0.67	13	15	4.6	10.2	23.1	1893	3	2.8	11.5	1927	43	13.4	-24.3	
0	1	9.60	+6.12	17	13	2.8	5.5	20.2	1918	3	2.3	13.5	1918	17	8.0	- 9.7	
0	1	2.71	-0.59	17	19	11.9	19.1	50.6	1945	5	8.0	30.5	1945	52	39.7	-31.2	
0	1	3.21	-0.40	9	12	13.7	11.8	35.7	1904	6	6.0	22.1	1948	39	37.1	- 3.9	
0	1	5.63	+1.97	13	12	4.8	7.7	26.2	1925	3	3.5	16.3	1935	40	43.0	+13.0	
0	0	5.08	+1.53	16	11	5.0	6.2	31.5	1922	2	3.5	28.0	1922	30	14.2	- 4.9	
0	0	2.66	-1.00	10	11	T	2.0	20.0	1893	0	T	13.5	1893	21	T	- 4.7	
0	0	4.57	-0.46	13	12	T	1.0	8.3	1940	0	T	8.3	1940	31	T	- 2.5	
0	0	9.87	+4.06	17	10	4.0	1.9	15.1	1948	3	4.0	10.2	1918	27	4.0	- 1.3	
0	0	3.26	-1.08	10	10	0	0.1	.....	.....	0	0	.....	.....	25	0	- 0.2	
0	0	1.46	-1.34	4	8	0	T	T	1935	0	0	T	1935	24	0	.....	
0	0	0.14	-2.13	3	8	0	0	0	0	0	0	0	0	33	0	.....	

## SPEED

- to clear at 20-30 mph.
- to throw snow off the road
- to clear more miles per hour

## STAMINA

- to operate on 24-hour schedules
- to buck thru deepest drifts
- to cut down high windrows

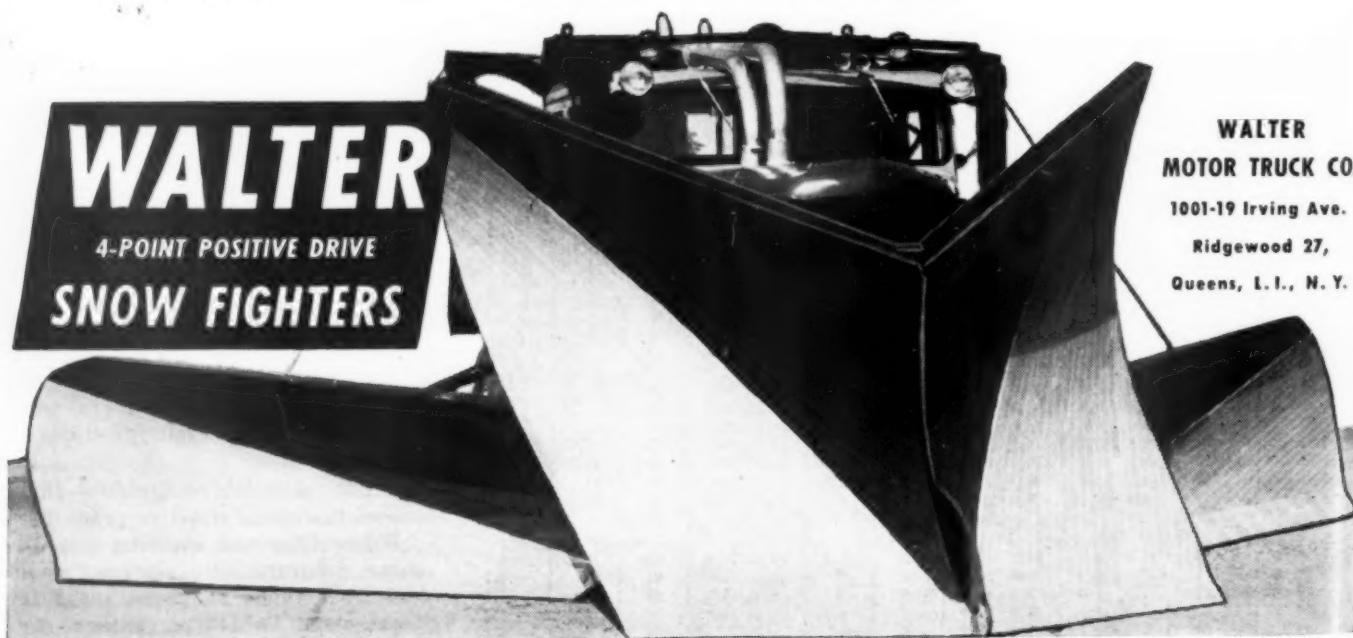


**W**ALTER SNOW FIGHTERS, with their great speed, power and traction, not only open your roads fast—but they have the ruggedness and reserve ability to keep battling without fail, day and night, until the job is done. This Walter dependability is vital in winter emergencies where life and property are at stake.

Walter Snow Fighters clear faster because of their great engine power (240-250 hp.) and the unfailing 100% traction of the Four-Point Positive Drive. This provides maximum plowing speeds for pouring snow, opening drifts or travelling slippery surfaces and grades, without side-slipping, wheel spinning or stalling.

The ruggedness of Walter Snow Fighters results from their special, scientific construction for snow removal, including larger gear capacity, tractor type transmission, powerful chassis, high-capacity plows and wings, special hydraulic controls and other accessories essential to efficient, safe snow fighting under all possible conditions.

Ask your Walter distributor for the facts — or write us for literature.



**WALTER**  
4-POINT POSITIVE DRIVE  
**SNOW FIGHTERS**

**WALTER**  
**MOTOR TRUCK CO.**  
1001-19 Irving Ave.  
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Queens, L. I., N. Y.

chargeable to emergency. Non-county agencies removed snow for roads on rescue missions where the county would have had to plow the roads under ordinary circumstances. Counties sometimes were without usable funds.

### Feared Bad Thaw

Idaho spring conditions were anticipated with some dread, judging from these excerpts from a federal report dated March 8:

"It will be difficult to estimate abnormal maintenance expenditures required for the clearing and thawing drainage facilities and repair of erosions, wash-outs, flood protection, etc., should a quick thaw develop. A taste of what could happen has been experienced. Water was over the highway in many places. Pipes are still snow and ice covered, snow and ice is still on the shoulders and in the ditches; therefore, in general the only open water course remaining is the cleared or half-cleared roadway.

"This year frost has penetrated much deeper than normal in most parts of the state. Frost heaves are being experienced at places that have never before shown signs of distress. Breakup has started in certain localities now and load limits have been posted on most highway routes . . .

"Drainage difficulties will continue to be experienced. Packed snow still remains along the edges of the oil surface for many miles of highway. Sufficient equipment has not been available to push it back so that the melting snow water will be carried by the ditches. Culverts are clogged and must be located and cleared. The softening of the roadbed and shoulders due to daily thawing and moisture accumulations are making it more and more difficult to use heavy wheeled equipment, such as rotary plows, heavy trucks with V and wings for widening narrow cuts through the snow banks. This situation will be serious and of great danger to the stability of surfaces and roadbeds should abnormal warm weather and/or rains be experienced during the next 2 or 3 weeks."

### Kansas Had Troubles

While not in the declared "disaster area," Kansas was hit hard for a time. According to L. J. Siler, maintenance engineer, Kansas Highway Commission, weather conditions were unusually troublesome from the standpoint of highway maintenance.

At the storm's height the commission sent out radio warnings for motorists to stay off the highways to prevent loss of life, and roads out of many towns were actually barricaded. Warnings applied to all travel in the western two-thirds.

The first storm, that of Nov. 18-19, was the most difficult to clear. Operators could not keep equipment on the road, due to lack of visibility. High winds packed drifts so hard that ordinary truck-mounted displacement

## Equipment Employed by Highway Departments to Fight the Blizzards

Type and No. of Units	Colo.	Idaho	Kans.	Mont.	Nebr.	Nev.	N.D.	S.D.	Utah	Wyo.
Trucks—4wd.			12	108	148	70	34			29
Trucks—5 T. or larger			15	26	0	13	0			(No rep.)
Trucks—under 5 tons			375 <sup>(1)</sup>	326 <sup>(2)</sup>	150	46	134			(No rep.)
Rotary plows			1	14	25 <sup>(4)</sup>	13	10			13
V-plows			300	72	135	53	139			78 <sup>(6)</sup>
Blade plows			(No rep.)	236	(No rep.)	112	(No rep.)			151
Motor graders			150	40 <sup>(3)</sup>	336 <sup>(5)</sup>	39	83			
Track-type tractors with dozers			10	2	8 <sup>(6)</sup>	7	12 <sup>(7)</sup>			
Sanding units			12 <sup>(1)</sup>	46	26	15	48			
Flatbed trailers			(No rep.)	10	12	5	8			(No rep.)
Front end loaders			(No rep.)	(No rep.)	(No rep.)	8	(No rep.)			(No rep.)

<sup>(1)</sup> Many used for sanding  
<sup>(2)</sup> 30 used exclusively for sanding  
<sup>(3)</sup> No plows mounted  
<sup>(4)</sup> Plus 16 rented

<sup>(5)</sup> Plus 6 rented  
<sup>(6)</sup> Plus 16 rented  
<sup>(7)</sup> Plus 12 rented  
<sup>(8)</sup> 29 with wings

Colorado's snow equipment (received too late for table) included 84 heavy trucks, 30 under-5-t. trucks, 8 rotaries, 15 V's, 16 motor graders, 6 dozers, 30 sanding units, 3 trailers, 2 power shovels, several loaders, number of blade plows not reported.

plows could move only the shallowest drifts. Even heavy diesel motor graders could not move some comparatively shallow drifts. Bulldozers were resorted to for deeper drifts, and in the northwest some roads were blocked for as long as six days, an unprecedented experience. Eastern equipment was sent into the western part.

Rail service and 'phone lines were also tied up, and railroad companies also employed bulldozers. The Kansas highway department's state-wide FM short-wave radio system broke down during the storm, adding to the complications.

Kansas being in a relatively mild belt has not had to resort to rotaries in previous winters. This winter, however, repeated storms drifted snow into one-way plowed paths, and displacement became a problem. A war-surplus Bros rotary mounted on a FWD truck was secured at Topeka and rushed to the area, and a similar new unit also purchased. These machines were slowed by ice in the drifts, and at times were unable to cut directly into packed snow and ice. Heavy motor graders aided the rotaries by loosening and windrowing icy material.

Slipperiness was more of a problem than usual in Kansas last winter. A very large amount of abrasives and salt—perhaps four times normal—was used, and much overtime put in by the sanding crews, especially in the eastern half.

### Needs Heavier Equipment

The Kansas highway commission has about 270 trucks of 1½ to 2 ton capacity, about 160 trucks of 3 to 4 tons, and about 30 over 5 tons, most with two-speed axles. Displacement plows were available for most trucks. The commission also has several heavy motor graders, including some of the most modern type with snow plows and wings.

Up until this winter, said Mr. Siler, the state's heavy equipment fleet was considered fairly adequate for usual conditions. But with the greater and greater public dependence on 365-day

highway service, and memory of past winter, the highway commission is considering addition of some new heavier machinery. A limited number of rotary units, more wings for motor graders and heavy trucks to widen cuts and move snow back from shoulders, are to be added. According to Mr. Siler, "this type of equipment will help do the widening job, lessen the tendency of redrafting, enabling us to do a better job of clearing the entire roadway and shoulders and thus preventing subgrade damage from the impounded melt. It is considered cheapest and fastest to open up drifts of 5 to 8 ft. depth with displacement plows, depending on the degree of compaction, and put rotaries in deeper spots. Rotaries also have been found to be practical for widening cuts following the V's."

In Kansas considerable trouble was reported with gasoline motors shorting out, and air intakes clogging and freezing. Satisfactory solutions to these troubles during extreme storms are considered highly needed.

### Montana Emphasizes Blades

Although Montana's winter wasn't as severe as in some other states, W. E. Bawden, associate maintenance engineer, estimated the winter maintenance costs, including sanding, at \$730,000 for state roads to April 15, compared with \$477,000 for the previous winter (highway department costs only). In addition the state highway department supervised \$40,000 in work on county roads and trails, under the FWA emergency grant. The Bureau of Land Management, operating on projects approved by the State Coordinator, supervised local road and trail clearing financed by Interior Department funds, totaling another \$130,000. Street and road clearing as reported by 12 representative Montana municipalities cost another \$282,000. County costs for winter work are conservatively estimated at not less than \$723,000.

Severe winter conditions do not necessarily mean severe spring road damage, noted this Montana official. Alternate excessive freezing and thawing temperatures, and the amount of precipitation while frost is leaving the ground, are more likely to affect the spring break-up. At the time of this report (May 1), extreme conditions were not experienced.

In clearing roads, Montana highway officials feel that the ordinary blade plow is the first line of defense. Blades on 1½ and 2-ton trucks handle everything up to about 8 inches depth, and with high-speed operation throw snow clear of the road. Heavier units are used when the situation gets beyond lighter equipment. Regular state highway equipment employed last winter included 236 blades, 72 V's, 14 rotaries, 40 graders with no plows mounted, 46 sanding units, 10 flatbeds, and about 400 trucks, including 12 all-wheel-drive units and some other heavy trucks. In addition about 75 rented crawler tractors with dozers or angledozers were used on the arterial system, totaling 13,000 tractor-hours of service.

#### Montana's Disaster Plan

Because of the general lack of a plan for joint or coordinated action in the winter emergency, much in-

terest is focused on the "Livestock Preservation Plan" perfected for Montana. All agencies united to create an efficient set-up for reporting, screening and administering federal assistance. Scott Hart, state highway engineer, was named coordinator. Screening in general succeeded in limiting assistance to essential needs which could not be met locally.

According to one observer, federal relief in Montana was exceptionally well handled. Provision of feed and its transportation was left to local agencies which were quite able to handle these phases. In the extremely severe blizzard conditions which prevailed, clearing of roads to provide access was beyond the ability of the counties and equipment locally available. Federal relief was therefore properly applied only to this phase.

In putting this plan into action, Mr. Hart, on January 30, wrote highway district engineers outlining the plan, and noting explicitly what the plan called for. It ordered that aid requests for clearing local roads coming from livestock owners or other citizens be cleared through the county agent, or through the chairman of the county board of commissioners, if no county agent; thence to the state commissioner of agriculture; and fi-

nally to the highway department headquarters, where necessary action would be determined.

A telegram was sent to every county commission chairman outlining the plan and instructing how to request aid, copies of this wire also going to all federal agency officials in the state.

The plan itself, as clearly outlined, limited requests to the state objectives of the plan. The plan called for:

1. Surveys to determine needs.
2. The locating of sources of feed.
3. The procurement of feed, where necessary.
4. The opening, or clearing of snow from roads and trails.
5. The furnishing of trucks for the transportation of feed, where necessary.
6. The providing of "airlift" facilities for the transportation and distribution of feed, where necessary.
7. An agreed method of financing the various activities involved.

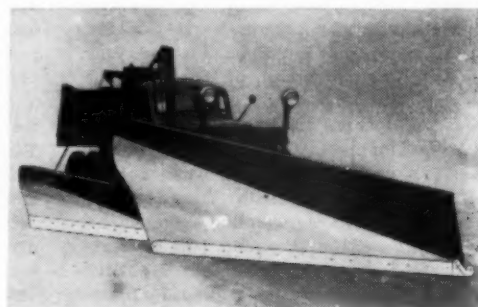
There follows then a detailed plan of operation, instructing livestock owners, county agents or commissioners, and others on their part, even going so far as to list the items of information that should be included in aid requests. This detailed and thorough method was designed to eliminate some of the confusion at a time when every plea seems more desperate than the last, and permit setting up a priority schedule of tasks on a merit basis.

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**V Type Sno-Plows** for motor trucks with Heel Adjusting Chains which automatically ballast the front end of the truck to prevent side slipping—an exclusive feature found only in the Frink. Made in 11 standard sizes for trucks from 1½ tons up to 12 tons capacity. Either hand or power hydraulic control.

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One Way Sno-Plow



Side Leveling Wing

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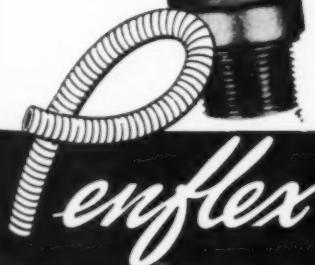
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## Brr!! Weather Data, Chadron, Nebraska, for January, 1949

January	High Temp.	Low Temp.	High Winds	Low Winds	New Snow
1	38	14	W NW 16	W 2	0
2	33	2	N NE 30	Calm	3.3
3	7	-2	N 37	SW 10	27.2
4	11	8	NW 41	NW 13	8.8
5	29	10	W NW 47	S SW 10	0
6	38	17	SW 28	SW 3	0
7	42	20	SW 17	Calm	0
8	34	4	N NE 35	Calm	.3
9	5	-8	N NE 15	NE 6	1.7
10	-1	-8	N NE 10	Calm	5.4
11	11	-10	SW 14	SW 2	Trace
12	24	-7	SW 16	N 4	0
13	37	8	S SW 18	Calm	0
14	39	2	SW 26	Calm	0
15	30	9	NW 32	Calm	3.5
16	17	-15	NW 32	SW 2	0
17	27	16	SW 19	Calm	.6
18	23	-16	NW 18	Calm	3.6
19	6	-26	N 18	Calm	0
20	-4	-26	N 18	Calm	Trace
21	26	-29	S SW 45	Calm	0
22	25	-8	NE 20	NE 3	Range
23	-2	-14	W NW 26	NE 4	.2
24	-5	-17	NW 22	Calm	0
25	13	-15	SW 8	Calm	0
26	24	-19	S SW 21	Calm	0
27	20	-2	NE 32	SW 2	3.0
28	7	-10	W NW 30	Calm	Trace
29	19	-12	NW 26	SW 3	0
30	27	14	N W 24	W SW 4	1.1
31	22	-5	W NW 28	NW 6	2.5

Total for month 61.2 in.—Official daily weather figures at the Chadron Airport.

61.2 Inches

The state highway maintenance engineer was then instructed in his department's duties:

a. Compile a complete inventory, and arrange to secure control of all snow removal equipment and trucks, both state-owned and otherwise, which may be made available for this operation.

b. Dispatch equipment to snow removal and hauling operations in accordance with requests transmitted to him by the State Co-ordinator.

c. Assemble surplus equipment in the threatened areas in accordance with such instructions as he may receive from the State Co-ordinator.

d. Maintain a complete record of all operations carried on under his direction.

Other paragraphs were devoted to details of finance and cost reporting.

### Nebraska Worst Hit

As outlined by John McMeekin, maintenance engineer, Nebraska's state highway department had its job cut out for it beginning Nov. 17, when storm hit without warning. Snow completely stopped traffic in the western part. Rain had previously fallen and frozen, and sanding trucks were all out. Before these trucks could accomplish much a 50-mile gale hit, ending visibility, and the fight was on.

This storm moved east, covering all but the southeastern corner, where rain fell. By Nov. 20 from 4 to 14 in. of snow had fallen, the stuff being wet and heavy and hard to remove after freezing. Drifts in places reached 10 to 15 feet depth. Actual snow removal and opening of drifts

started in Western Nebraska late Nov. 19, and in the eastern part next day. Telephones were out of order. However, thanks to pre-arranged plans, all snow removal equipment was at work as soon as visibility improved and wind subsided.

The department used 16 to 25 rotary type plows and 120 to 150 all-wheel-drive trucks with V-plows. These units, as usual, had been stationed at strategic points throughout the state. In addition about 70 heavy-duty motor graders, many equipped with V-plows and wings, were used.

While storms of this severity are not unusual in Nebraska, rarely do they occur so early and last so long. In the deeper drifts the V-plows proved ineffective and even the rotaries could not penetrate the drifts without assistance. Heavy crawler tractors with bulldozers were used extensively to open drifts other plows could not penetrate.

The entire highway system was open by late Nov. 22, and within a few days plow cuts were widened to the full roadway widths. But light snow and wind continued to give trouble and block certain sections near larger drifts, all during December.

### Worst in History

"We felt that this was one of our worst storms," said McMeekin. "However, on Dec. 24, from 8 to 12 in. of new snow fell in the extreme northern part, where all roads were again generally blocked.

"Removal of this latest snow was

not accomplished when on Jan. 2 snow again started to fall in the west, spreading easterly across the state, accompanied by 50 to 60 mph. winds with gusts as high as 75 mph. Depths of snow up to 16 to 44 in. were recorded in the west with a lesser amount in the eastern part of the state. By Jan. 4 p.m. all roads over 80% of the state were blocked; some 8,000 miles of the 9,400 miles of state roads. This storm continued without abating until Jan. 7. We were to discover that it was much more severe than any previously encountered in the department's history.

"Nearly all rail traffic was at a standstill. Highway travel on nearly all roads was paralyzed. Many people had been trapped since early in the storm. Rescue efforts were again pushed. However, little could be accomplished except in the vicinity of maintenance headquarters. Several plows and crews on rescue work were stranded and, unable to proceed or to return to their headquarters, spent from one to two days either in their trucks or at farm houses.

"On Jan. 7, maintenance forces again started to clean up roads for travel. Good progress was made despite the tremendous volume of snow to be handled, low temperatures and the usual equipment breakdowns. Nearly all roads were again open, but not widened by Jan. 15 when light snow and high winds again blocked all roads in the extreme west and the north sections. Maintenance forces have been working Sundays, holidays and long hours since the Nov. 17 storm.

According to Mr. McMeekin, "Intermittent snows accompanied by high winds continued in February and not until Feb. 22 were all roads on the system open at one time. Widening and the removal from shoulders continued until mid-March. Our problem then was floods, soft subgrades and of ice going out of streams. On March 24 and 25, heavy wet snow, amounting to 10 in. at Sidney, fell accompanied by high winds causing drifts and zero visibility in the northwest. On March 30 and 31 about three-fourths of the state was again covered by heavy wet snow—in places 6-18 in.; more wind and drifts. This snow was extremely difficult to remove, in that subgrades were wet and soft and truck-type snow plows moved with considerable difficulty and numerous break-downs occurred.

Roads were not all opened until April 7, and then many gravel roads were impassable due to soft subgrades.

### 900 Army Units

Nebraska's official disaster area took in 58 counties. Typical of the detailed manner of handling disaster areas in each state, the area was divided into nine army-directed sub-areas. Local or "hay" road clearing

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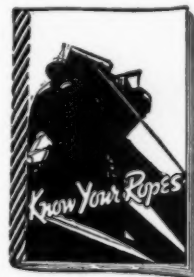
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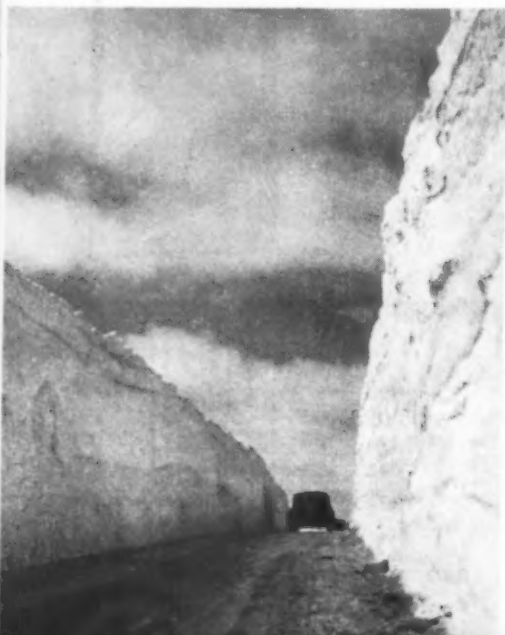
★ A Bros rotary did yeoman service for the Nebraska highway department

in Nebraska under the corps of engineers reportedly utilized 764 dozers, 104 "Weasels," 55 motor graders, 6 plows, 5 rotaries, numerous lowboy trailers and trucks, and several airplanes and helicopters. Some 19,627 miles of side roads had been opened up, as of Feb. 12, working out of five sub-area offices of the corps.

In one western area (sub-area 6 around North Platte), for example, 49 Caterpillar D8, D7 and D6 tractor-dozer worked in the three large counties, served by 10 trailers. Dozers operated 20 hours a day from Feb. 2 to 12, and trailers were in almost constant use after that. The army had 22 trucks and 4 Weasels in the area. Contractors furnishing equipment were guaranteed an 8-hour day. From 15 to 50 in. of snow lay on the ground. Strong winds had created many 12 to 15 ft. drifts.

Sub-area 1 in northeastern Nebraska, taking in thirteen populous counties, utilized a peak of 193 army-procured

★ Route 32, twelve miles west of Madison, Nebraska—contender for worst drift of the winter



dozers in addition to state highway equipment. The work in this area was pushed on the principle of letting citizens make their wants known through local road supervisors or officials. Live-stock feed was the principal matter at hand. An idea of the conditions is shown by the fact that drifts 8 to 12 ft. deep stretched 1,000 to 2,000 ft. One county road 11 miles long required 14 days to open with a D6 dozer and patrol grader.

### Plowed Over and Over

Following is a detailed account of the almost endless plowing task, as encountered in the Nebraska state highway district 3, at Norfolk. District route mileage is 1400. Following the mid-November storm all roads were blocked, but reopened by Dec. 1.

On Dec. 25, another blow; all roads reopened by Jan. 8. Storm on Jan. 9-10 re-blocked the roads; reopened 14th. On January 15, 40 mph winds redrifted many miles, reopened by 17th. Redrifting again 18th, reopened Jan. 20. Redrifting occurred Jan. 21, and all but 150 miles open Jan. 26. Redrifting 27th, and a new snow blocked all roads by 28th. About 500 miles open Jan. 29, and 912 miles by Jan. 31; 488 miles still blocked. All opened by Feb. 9. Then on Feb. 10 more redrifting, and as of Feb. 12, 132 miles needed reopening.

District No. 3 has 9 rotaries and 15 V-plows. With normal expected breakdowns, about 60% of this equipment is active at any one time. The State of Iowa sent 4 rotaries, and they worked about a week. Almost all of the rotaries from Iowa had serious breakdowns of one kind or another due to the very hard snow and ice.

The State has purchased one new Bros snow removal rotary for dist. 3, and this particular piece of equipment, according to one engineer, seems to have been the most satisfactory in handling the snow which has occurred this winter. This equipment was mounted on a FWD-M-7 truck. It opened 122 miles in 4 days and traveled 300 miles in doing that work between Jan. 15 and Jan. 18. At one time this equipment spent 5 days going 25 miles where the snow had frozen and it was particularly tough.

Sidelight on equipment efficiency: A contractor representative advised that his firm's equipment was far less efficient from fuel and oil consumption standpoint on this work than on normal grading operations; for example, A D-7 Caterpillar with bulldozer attached uses from 4 to 5 gal. of oil and around 70 gal. of distillate per 20-hour day. This is about twice the oil and 25% to 30% more distillate required on normal grading work.

### Nevada Needed Equipment

The past winter was the most severe in the recorded weather history of Nevada, reported state highway engineer W. T. Holcomb. There have been heavier snowfalls and more intense cold but never for the extended

periods recently experienced. The snow had a low moisture content and moved with the slightest wind. Wind that at times approached hurricane velocities resulted in speedy drifting, sometimes immediately behind a plow. Highways were closed for a few hours to several days. For the first time in the history of the state snow fell in extreme southern Nevada sufficient to require removal. As snow equipment is not normally maintained in the area, removal costs were high.

Nevada's estimated winter state road cost of \$260,000 exceeds the \$100,000 budgeted yearly for "out of the ordinary" snow removal and flood damage. This unexpected expenditure will not affect construction financed with federal highway funds and matched with state funds but it will curtail, by some \$200,000 highway betterment with state funds only," said Mr. Holcomb.

Nevada's state road equipment included 10 rotaries, 112 blade plows and 53 V's, and also the following equipment normally used for maintenance as well as snow work:

- 39 Motor patrol graders
- 6 D7 tractors and dozers
- 8 Front end loaders (Scoopmobiles)
- 70 4-6 ton all wheel drive dump trucks
- 46 2-ton and over, single drive dump trucks
- 5 Tractor trucks and semi-trailers

One-third of this equipment was massed in the vicinity of Ely and Caliente where some county roads as well as arterials were cleared. The early-February weather was particularly bad around Ely, where 12 large trailer loads of hay were stuck on US 50 for five days.

The four large Nevada counties in the stricken area did not have sufficient equipment to cope with needs. The state rented contractors' equipment and sent it to Lincoln and Elko counties, including ten D8 Caterpillars with dozers, one HD-14 International tractor with angledozer, 4 trucks, several large flatbeds. The latter hauled hay as well as equipment.

The California National Guard sent 19 army trucks (6x6's) and 39 men to snow work near Caliente. The Nevada National Guard had 6 trucks and 19 men at Ely. The Forest Service also performed much emergency work in Nevada, as in other states and so did the U.S. Bureau of Land Management which rented much contractor-owned equipment under the federal emergency program.

### North Dakota Notes

No attempt will be made to review the weather in North Dakota, except to say that it was the coldest since 1935-36, and one of the worst in wind and drifting. As noted by one engineer, the roads in this windswept part

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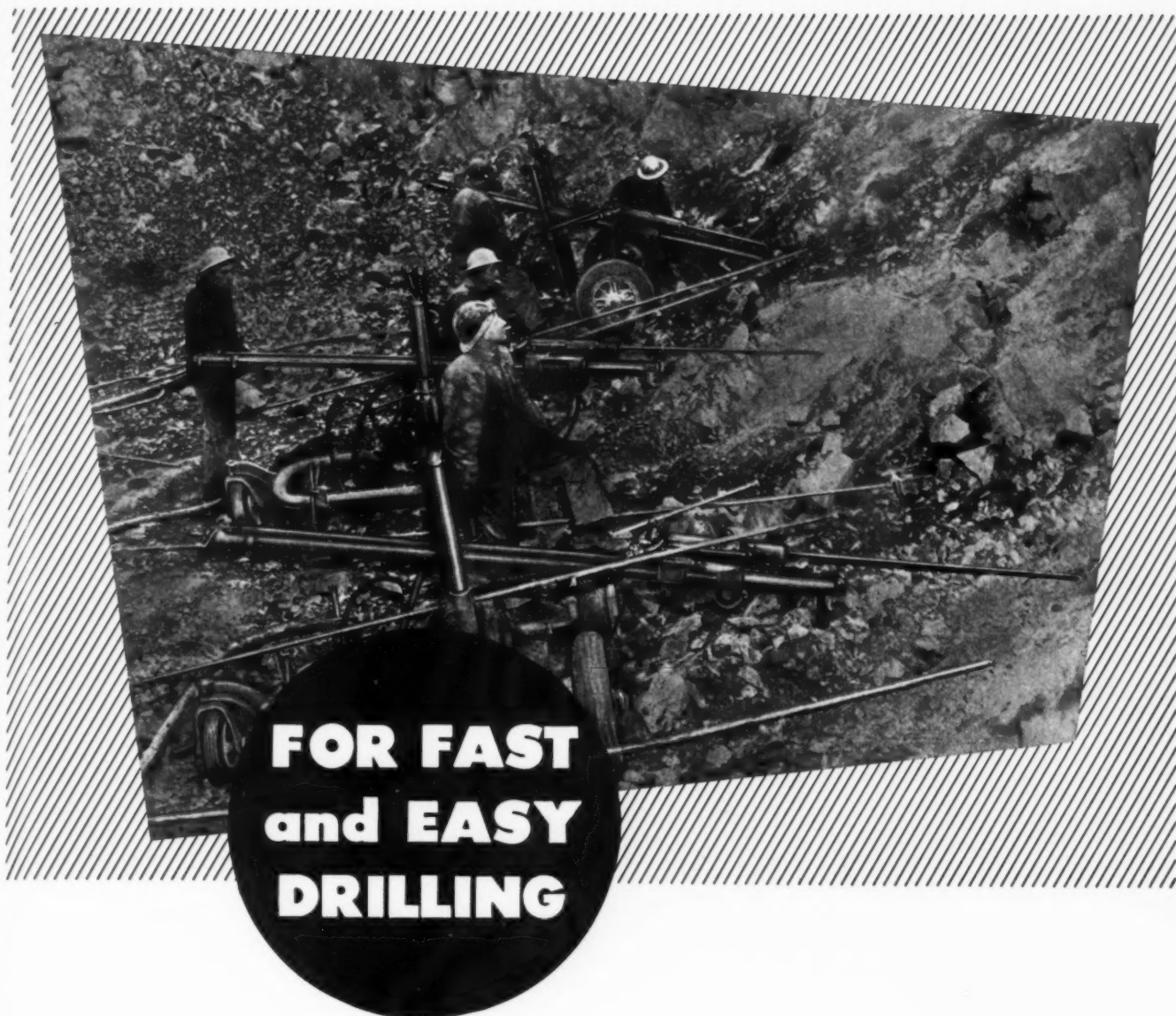
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the Wagon Drill can be quickly adjusted for toe-hole drilling or bench drilling. For line drilling, or drilling close to the face, the carriage wheels can be turned at right angles.

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★ Huge snow slide—one of many encountered last winter. Note size of rotary in relation to slide, which occupies most of this scene



★ A smaller model rotary, mounted on 5-ton truck with rear-wheel drive

## Last Winter in Wyoming



★ Rotary cuts like this filled up in a few minutes when the wind started up again (if it ever quit). Note how snow tended to "canyon" along the road from successive V-plow and rotary passes

★ One of the deepest cuts—snapped Feb. 10, 1949, two miles south of Jackson, Wyoming, by highway department men



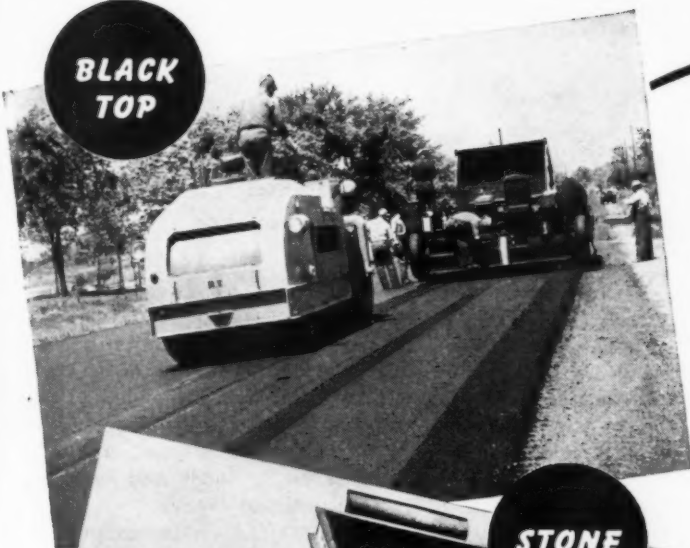
(All photos courtesy Wyoming state highway department staff)



★ Rotaries stayed out continuously, were absolutely indispensable last winter

★ The eastern Wyoming town of Lusk was literally buried in spots. Here's the main street after the November blow

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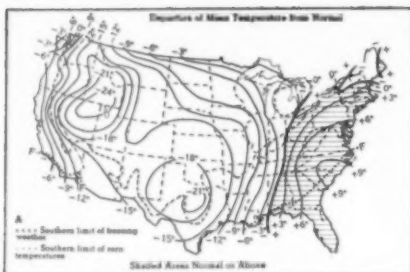
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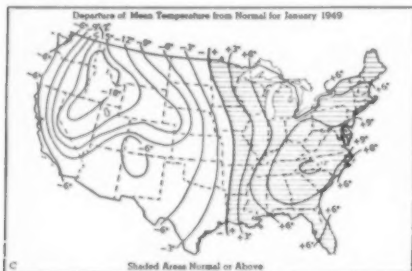
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★ An unusually cold week last winter, ending Feb. 1



★ At a glance—why January was so mean in West, mild in East

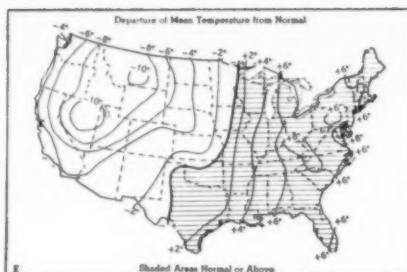
of the world suffered more from drifting than from the amount of snowfall, particularly where old "submerged" grade lines existed.

The governor on Jan. 29 declared an emergency and authorized state highway forces to use part of their equipment off the state system. All equipment usually stationed in the southeast and south-central areas was moved at one time to the northern area of heavy snowfall. Three new heavy trucks with V or rotary plows were purchased from distributors. Contractors' equipment from Garrison dam and army-owned units aided, heavy dozers again proving particularly useful in opening trails through packed drifts in the 22 counties declared under the federal disaster area. Army-operated equipment was gradually increased all through February, and on March 4 reached a peak of 401 dozers, 24 truck plows, 8 rotaries and 32 motor graders.

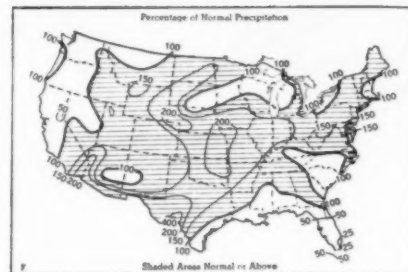
As a result of excellent cooperation between all agencies in North Dakota, it was reported that no loss of life occurred due to lack of food or fuel, and livestock loss was minimized. Ray Robinson, state highway maintenance engineer, directed snow removal work for the highway department.

#### South Dakota's Special Set-up

South Dakota's western half was badly hit during January and these notes will be confined to a few details on conditions up to Feb. 1. On Jan. 25, the legislature passed a special \$100,000 disaster fund while authorizing state highway engineer H. C. Rempfer to take charge. Highway districts 4 and 5 in the west were immediately reorganized to handle the emergency work, radio broadcasts were sent out for equipment, and the con-



★ Weather for past winter, December through February



struction industry began assistance in enlisting personnel. A resident engineer was appointed for each county to supervise the work locally, with the priority need to be determined by a committee in each county consisting of the resident engineer, county engineer, a member of the Livestock Growers' Association, a county commissioner, and the county highway superintendent, if any.

Within two days after the fund's enactment, over 100 machines were working under this plan. Then continued high winds and drifting caused the governor to ask army aid under the federal disaster program. The army eventually contributed considerably in the area.

According to a weather man, at Rapid City, S. D., on Jan. 3, 1949, the wind averaged 52 mph, with an extreme speed of 72, the temperature remained between 0° and -4°, and the visibility was less than 5 ft. nearly all day. The wind had already reached 63 mph on the previous day; on the 4th averaged 56 mph, midnight to midnight, with extreme of 73. It was not until 5 p.m. of the 5th that the wind got down to 40 mph. Over 14 in. of snow fell and was blown into drifts, some as much as 15 to 20 ft. high. The temperature rose to 50° on the 6th and 55° on the 7th, melting the tops of the drifts, dropped below zero by 9:30 p.m. of the 8th; thus causing extremely hard ice crusted drifts that were almost impervious to snow plows.

The blades of rotary plows broke as they came in contact with snow-covered frozen livestock that had blundered into the highway and railroad cuts during the blizzard.

The temperature dropped to 35° below zero in this area during the famous blizzard of January 12, 1888, but the wind, snow, and duration of severe conditions were less than on January 2 to 5, 1949.

#### Utah Agencies Cooperated

In Utah as elsewhere no single agency had enough equipment or personnel to cope with conditions. A report stated that as of the 15th more miles of road were blocked than at any time during the winter, but that roads were finally all opened. Various agencies had contributed as follows:

State Road Commission: About 25 miles were being operated off the state system.

Forest Service: 28 units then operating, each consisting of a tractor, trailer and truck. Expended \$125,000 to date. This agency eager to have their equipment released, as they anticipate many floods and snow slides within national forests.

Bureau of Land Management: Had from 300 to 350 pieces working, including trucks. Total includes some equipment from other Interior Department agencies.

Utah National Guard: About 300 units reported in field. Included a large number of small pieces.

U. S. Army: About 40 pieces of heavy equipment and 40 auxiliary units reported. Ten planes engaged in "Haylift Operation."

Snowshed analyses during the winter showed that the lower the altitude in the mountains the wetter the snow, with snow in lowlands containing about 200% of normal moisture. Spring break-up conditions were unusually severe in certain areas. The necessity of using heavy tractors resulted in damage to surfaces, and some sections of road were expected to need a seal coat sooner, as a result.

#### Wyoming Comments

Wyoming highway department equipment was able to keep main highways open prior to Feb. 5 except for a few hours daily during worst storms, and except for certain passes or sections which give trouble every winter. One particularly bad section is US 287 north of Rawlins, where topography favors deep drifts. It was possible to detour around most drifts, but detours also filled in and new ones had to be cut.

"At Rawlins, Wyoming," according to John E. Wiley of the state highway department, "wind blew with velocities as high as 70 mph for 51 consecutive days! The greatest or longest period of block on U.S. 30 occurred in that vicinity. We even had instances of cars and pickups driving over the drifts. Snow grouse on tractors left the only mark on the packed drift. The normal tractor tread made no imprint.

"Effective snow removal was hampered by insistent travelers who would not follow instructions or even

**One of 8**

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**LINK-BELT SPEEDER**





★ Field service of a bulldozer is pictured here, and also a typical example of how dozers, by see-sawing laterally, can widen considerable distances of roadway through drifts. US 83, Ward County, North Dakota. Photo courtesy North Dakota state highway department

obey highway patrol orders. Much of their stubbornness can be charged to anxiety, but they certainly provided unnecessary and unwarranted problems, and the fact that a visible section of highway was passable gave them reason to believe that the road was being held closed out of sheer obstinacy. Most laws of highway use provide no legal manner to prevent people from passing up barricades."

#### Patrol Radio Helped

Excerpts from comments written by observers on Feb. 8 are given as follows:

"To minimize the difficulty of snow removal, the Wyoming highways are built with long flat slopes so that the snow will blow across the road. As a consequence, even during the worst blizzards there is very little snow on the greater length of the roads. The difficulty arises from the drifts which occur on a very small fraction of the total mileage. For example, the road was closed between Laramie and Rawlins, a distance of 115 miles, for three days by drifts which aggregated less than 2 miles in length.

"During this period, one convoy of cars was taken through east-bound behind the plows. The weather became so much worse when the plows returned, that west-bound vehicles were not able to get through. With wind velocities of 60 mph, the snow drifted in so fast behind the plows that the following cars got stuck. One car stalling in a storm of this nature often blocked the road, as plow paths filled in during the time consumed in getting the car out."

"The vehicles of the Wyoming Highway Patrol and the maintenance

foremen," continued these notes, "are equipped with two-way radios which are almost indispensable in escorting convoys of vehicles through the worst areas. Traffic automatically moves by convoy whenever there are blocks in the road as vehicles accumulate at each end of the blocked area. The radios are also indispensable in reporting conditions to the towns along the route so that vehicles can be released or held up as conditions warrant. Vehicles that attempt to get through in spite of warnings, often delay plowing seriously.

"Additional equipment and manpower needed would not prevent roads from being closed during worst blizzards, but would permit clearing sooner. Rotary plows, V-plows, one-way plows, dozers and motor patrols all have their place and all are needed for a well-equipped snow removal organization. The rotary plow is considered the best all-around unit for main highway use. At this time, however, many drifts kept open by rotary plows have now filled and the snow packed so solidly by high winds that dozers will be required to speed removal. The dozer is also indispensable in widening out where the rotary plow has cleared the road.

"The effectiveness of the dozer during periods of high winds can be increased many times by providing a cab to protect the operator. Even a make-shift arrangement of canvas and ordinary windows is helpful.

"It is often possible with a dozer and motor patrol to detour the large drifts and keep traffic moving. Rotary plows and V-plows do not have sufficient clear-

ance for off highway operations unless conditions are very favorable.

#### Snow Fence Problem

"Snow fence is used throughout Wyoming where drifting is a problem. Both the stationary railroad type fence and the portable slat-type fence are used. Drifting conditions have prevailed so long this season, however, that the area between the fence and the road has been completely filled with snow and the drifts are extending across the road. Additional snow fence could have been used to advantage in many locations by placing it back farther from the road and lengthening it.

"Proper placing and handling of snow fence is an art that few possess. It is believed that the experience and knowledge of the men in the highway department responsible for snow removal should be consolidated and a program of snow fencing worked out to alleviate the trouble spots to the fullest practical extent. If full advantage is to be realized from past experience, it is believed that records should be kept. There is a tendency to become lulled into a false feeling of security by a series of open winters. When weather such as has occurred this winter strikes, there is a likelihood of being caught unprepared."

Equipment available for snow work by the Wyoming state highway department, noted this report, included the following:

1½ ton trucks	147
2-3 ton trucks	68
6 T trucks	5
3 ton or less, all wheel drive trucks	2
3½-8 ton trucks, all wheel drive	36
Motor graders	71
Small rotary snow plows	6
Large rotary snow plows	6
Tractors with angle dozers	10
Snow plows blade type	151
Snow plow V type 1½ to 3 ton	21
Snow plows V type 3 to 6 ton	28

Up to Feb. 10 little army-operated equipment was in use in Wyoming, but by Feb. 17 the following were reported at work: 128 bulldozers, 2 truck plows, 5 rotaries, 73 trucks, 32 Weasels, 42 motor patrols, 50 lowboys. This included hired equipment. The Interior Department had 41 dozers and 3 rotaries out in the western part.

Counties also furnished considerable equipment, for local road and trail clearing only. Carbon County local road work was effectively handled by all agencies uniting under a county coordinating committee headed by the county agent and cooperating with army officials.

#### Out in the Wyoming Blizzard

Army equipment was characterized as being less than 50% efficient at first due to lack of experienced operating personnel, and for lack of protective cabs on the dozers. It was emphasized that the grader is not effective by itself in opening up relief lanes, but is excellent when following a dozer.

These notes touched on work ob-

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the best BUY in excavators**

**Bucyrus-Erie Company**

South Milwaukee, Wisconsin

139E48

served out in the storm, and help give the reader a picture of the difficulties:

"On February 4 we left Cheyenne for Torrington on U. S. 85. The highway was open but considerable widening out of snow banks through drifts remained to be done. In Torrington contact was made with the Goshen County Emergency Relief Board. This county was not served by Army. Snow removal was being accomplished by county owned equipment: 1 4-wheel drive Oshkosh truck with V-plow; 1 TD18 International tractor with dozer; 4 motor graders.

"In addition the county had rented 5 tractors. Under adverse conditions of blowing, snow feed was being conveyed to livestock preceded by a dozer or V-plow and a motor grader. Discussion with the local resident engineer indicated that under most conditions where snow depths required heavy equipment (snow over 18 in.) he preferred a large V-plow on a 4-wheel-drive truck or motor grader. However, they have the disadvantage of leaving high ridges at the side which must be removed to prevent additional aggravated drifting. A rotary snow plow does eliminate this by getting rid of the snow but they travel very slowly, about ¼ mile per hour when displacing snow. Under the toughest going with wind packed or heavily crusted snow neither rotary nor V-plow can compare to an angle-dozer. After a V-plow has made about 2 trips through 3 to 5 ft. drifts and the road closes in again, the snow is ridged and packed so hard at the sides that they make very little or no progress and a rotary plow or bull dozer is needed. Most engineers contacted on this trip agreed with the foregoing, also with the fact that they preferred the larger rotary models; where a rotary was needed, the small ones were very slow and they believed inefficient.

### Start Out Again

"Highway 87 was blocked at the Natrona-Johnson County line Feb. 6 and 7, and on the 8th we tried to get through again. One large drift near the county line was of such size that a large V-plow had become stuck in it and a ground blizzard snowed it in. A rotary Snogo opened up the cut about 3:00 p.m. and we went on through to 9 miles north of Casper through drifting snow and

ground blizzards. There the highway was again blocked and we sat for 16 hours from 5:30 p.m. waiting to be rescued. A large semi-trailer tank truck was stuck in the drift and an FWD V-plow sent out to rescue the sixty odd cars and trucks was unable to break through so it was necessary to wait for the rotary plow which was working toward us from behind.

"Too much credit or praise cannot be given to the maintenance employees on their snow equipment. Many of the men worked 16 to 24 hours without relief. The rotary plow and operator which finally opened up the road block where we were stalled, were out 25 hours without relief, and the plow went out with another operator just as soon as a quick check of the equipment could be made."

### Lessons and Conclusions

Following are a few general conclusions from the past winter's experience:

1. Highway departments cannot hope to equip for once-in-a-generation storms. Weather such as last winter's frequently went clear beyond men and machines.
2. But more equipment was needed and many new units hastily purchased and delivered. The recent experience has hastened the retirement of much old wornout equipment.
3. The chief value of more equipment will be to open the roads quicker.
4. Extreme storms require heavier equipment. Bulldozers for "peeling" down packed drifts, where rotaries usually suffice. More rotary capacity, heaviest and most powerful models preferred. More all-wheel-drive trucks.
5. Blade and V plows are still the backbone of the snow fleet, since they can get over huge mileages rapidly and meet ordinary conditions.
6. Motor grader mounted V's and rotaries made a fine showing. They can navigate off the roadway. Winter work increases the year-around use-

fulness of graders. Graders with V's or with scraper blades, ice blades or scarifiers work well in conjunction with rotaries or dozers in opening deep packed drifts.

7. Dozers and motor graders sent into emergency storm areas should have cabs, even if only makeshift. Cab units made up and stored in readiness, a justifiable project for some agency.

8. Radio telephone proved priceless last winter.

9. In western plains and mountain states, drifting is the chief problem. A very small total mileage of blocked roads caused nearly all the trouble.

10. Modern roadway design, with elevated windswept grade lines. Wide ditches and flat backslopes saved millions in plowing costs.

11. Dozer trenches as snow traps were often successful last winter. Snow fence skillfully located for average conditions often defeats its purpose in exceptionally high winds, by throwing snow too far; or it gets covered over.

12. A disaster plan is needed for future storm emergencies. It should include necessary legislation or rulings to eliminate financial red tape and provide funds; designate what public official shall direct work in each state; clearly define the respective duties of each public agency, with special emphasis on a sensible working plan of cooperation at county or other local levels. Advance planning would have saved millions of dollars last winter.

13. Contractors and equipment distributors were of vital service; their facilities should again be available under any emergency plan.

14. Chief emergency occurred off the state highway system; county and ranch access roads were the principal problem. In general arterials were blocked only briefly.

15. The western state highway departments can expect to require progressively more funds in the future for keeping highway transportation moving in winter. The economic stakes have multiplied many fold in recent years. Trucking especially is now a giant business vital to the West. The loss in gasoline tax revenue alone due to road blockages is a large item, and reducing this loss will partially repay cost of equipment needed to keep roads open.

16. State legislatures should be given the whole picture, so that necessary highway revenue sources will be established to assure adequate emergency and routine winter maintenance funds.



★ Detours around drifts were common. Here worker is shown standing in entrance to a re-filled cut, detour path at left. US 40 near Ely, Nevada, Feb. 13, 1949. Photo courtesy Nevada state highway department

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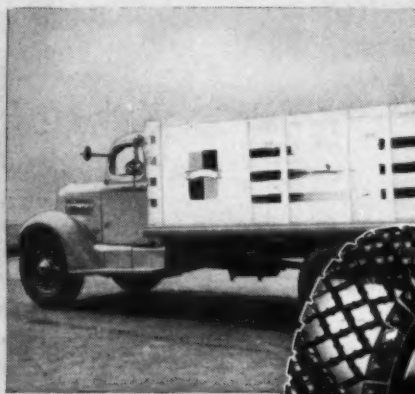


Where you have to go in off-the-highway to get the load, bring it out and over the road, use the *General H. C. T.* The sturdy, zig-zag tread digs deep for more traction in toughest going. Carries loads faster, safer, cheaper over the highway.

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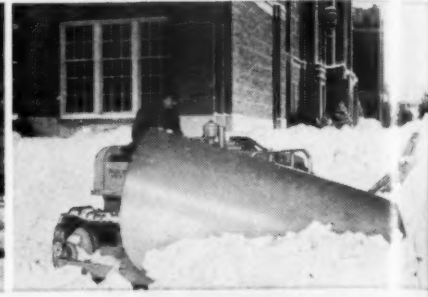
Not tied down to specialized duty



LOADING FROM PIT



LOADING SNOW



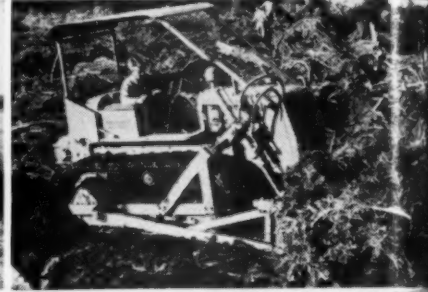
PLOWING SNOW



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PULLING SCRAPERS



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FEEDING ASPHALT AND CRUSHER PLANTS



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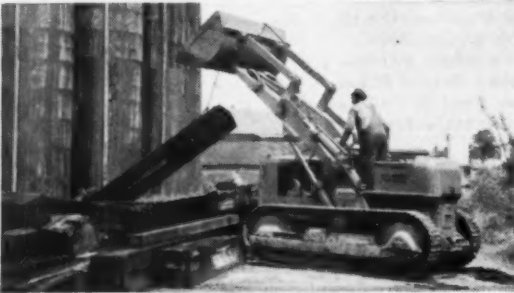
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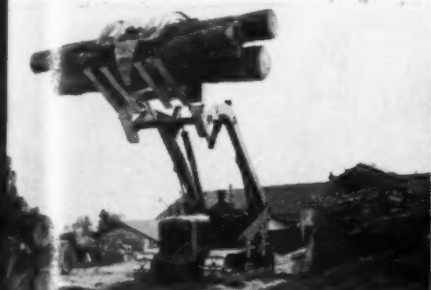
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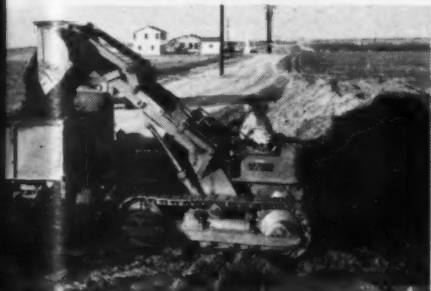
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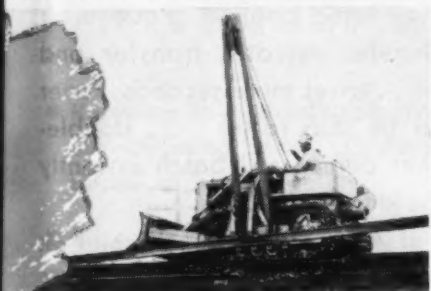
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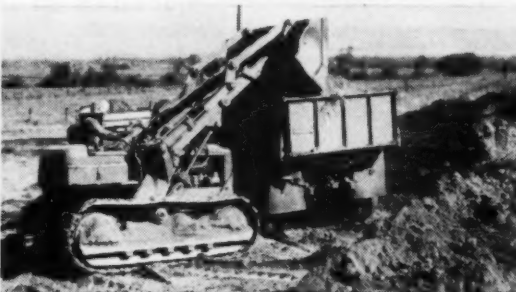
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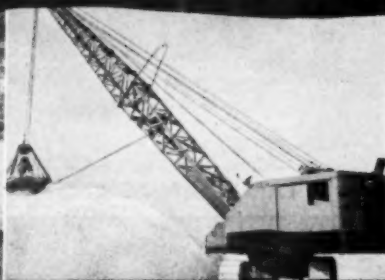
Full accessibility of every maintenance point on the Koehring heavy-duty 34-E *twinbatch* protects your profits against costly down-time . . . keeps production on schedule.

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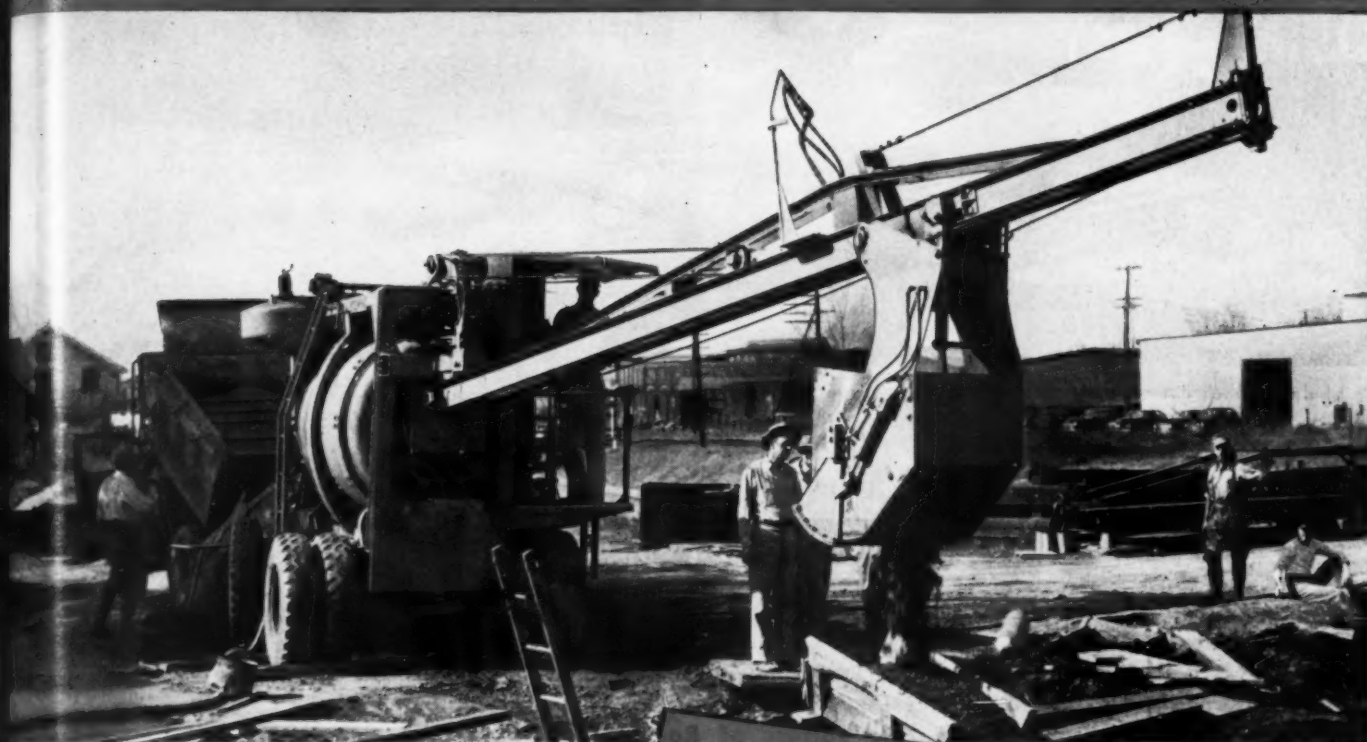
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## Our Program in Greece

The Grecian reconstruction and rehabilitation program. Because of the world-wide professional interest in the reconstruction program in Greece, the editors of *Roads and Streets* present this authoritative summary. Many of our highway department friends (some on leave) and Corps of Engineers acquaintances have participated in this unusual assignment

By

**Lt. Col. Robert R. Robertson**

Assistant, Construction Operations Division,  
Office of the Chief of Engineers,  
Washington, D. C.



★ Two types of road work employed in Greece are demonstrated here—grader spreading cold-laid road-mix, and bituminous paver at work on plant-mix project

**I**NTERIM aid for Greece and Turkey was approved by act of the U.S. Congress in May, 1947, when the President by executive order also prescribed regulation for carrying out the Act's provision.

A program of reconstruction and rehabilitation of roads, railroads,

bridges, ports and the Corinth Canal was determined to be of primary importance in reestablishing the economy of Greece. These communications facilities were largely wrecked as a result of the occupation and later withdrawal of British and German forces, each of which in turn destroyed key installations during evacuation. Maintenance neglect during the war years also contributed to the condition, which at war's end was such as to immobilize the transportation systems of Greece. Present estimates indicate that the completed program will cost 29 million dollars and 340 billion drachma, or 98 million dollars if drachma are converted to dollars.

### Organizing the Task

In view of the unsettled conditions in Greece, the U. S. State Department decided it would be to the best interests of the program to have the recon-

★ Another Grecian road project—rolling new asphaltic surface course, Salonika-Serras road

82



# New UNIT 1520 Self-Propelled RUBBER-TIRED CRANE

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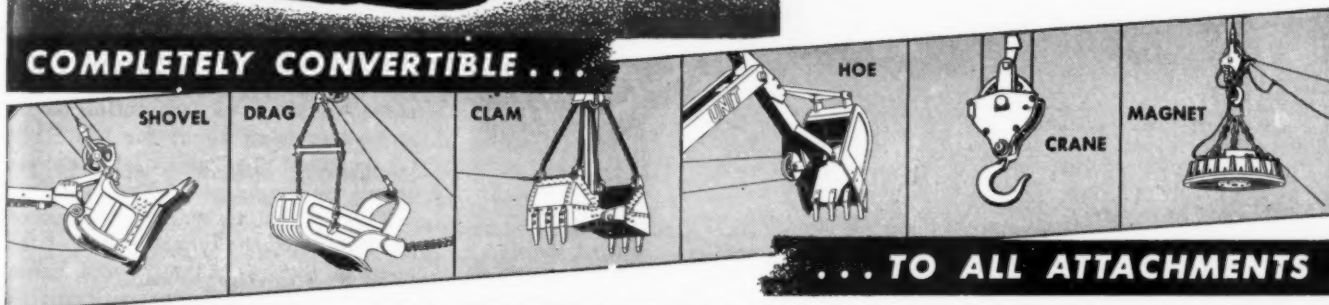
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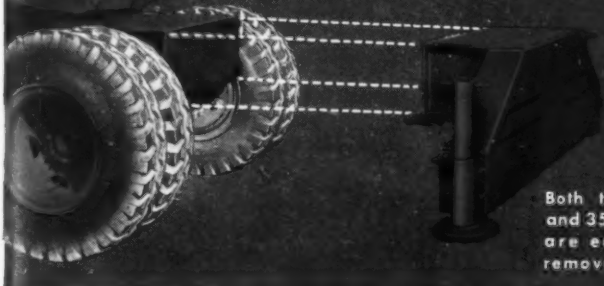
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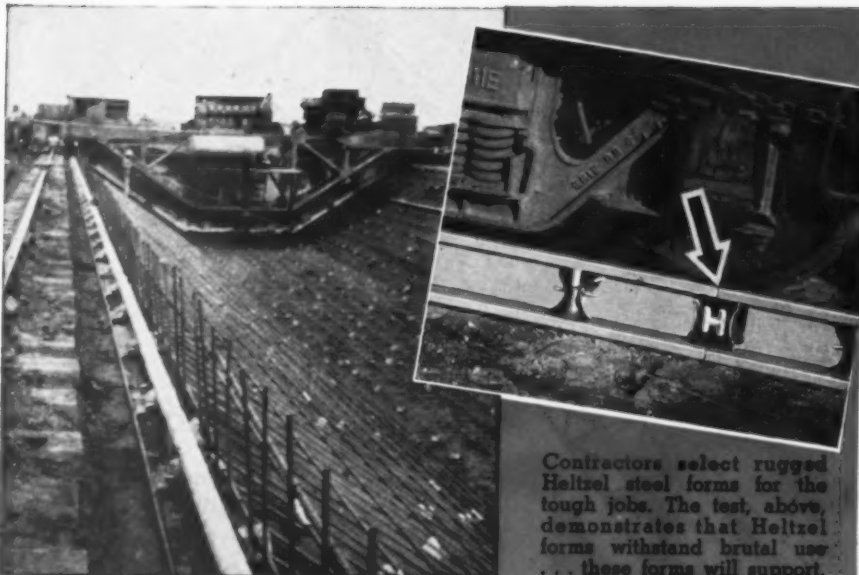


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★ Chevrolet trucks and other American equipment, at work on the Patras-Pyrgos road

struction and rehabilitation work accomplished with American contractors. Because of the unusual nature of the work and lack of definite knowledge as to its scope, it was necessary that the reconstruction be done on a cost-plus-a-fixed-fee basis. The contract for reconstruction and rehabilitation of railroads, highways and bridges was awarded to Johnson, Drake & Piper, Inc., of New York; Guy F. Atkinson, Inc., of San Francisco, and Starr, Park and Freeman, Inc. of New York, acting as co-venturers. The contract for reconstruction of three Greek ports and clearance of the Corinth Canal was made with Grove, Shepard, Wilson and Kruge, Inc., of New York and J. Rich Steers, Inc., of New York, also acting as co-venturers.

Before signing the contracts, it was decided by the Department of State that the most effective implementation of the reconstruction work in Greece would be achieved if, because of its wide experience, the Corps of Engineers would act as contracting officer and supervising agent for the U. S. Government. The proposal was accepted by the Corps of Engineers.

The original contemplated scope of work included the rehabilitation of the ports of Piraeus, Salonika and Volos, the rebuilding throughout Greece of the highway and railroad systems, and the clearing of the Corinth Canal. This was later augmented to include the reconstruction and improvement of ten airfields.

To accomplish the work the U. S. Chief of Engineers established a Grecian Engineer District. The District with headquarters in Athens and liaison and procurement offices in the U. S. established six subordinate areas with headquarters in Salonika, Larissa, Lamia, Patras, Corinth and Piraeus. A tentative plan of operations was prepared.

#### Piraeus Quay Walls

Facilities of the port of Piraeus, which serves Athens, had suffered the greatest damage. Repairs to 2043 linear meters of quay walls and two dry docks were required plus the replacement of grain silo and port operating equipment.

# FOR A BETTER DAY'S WORK



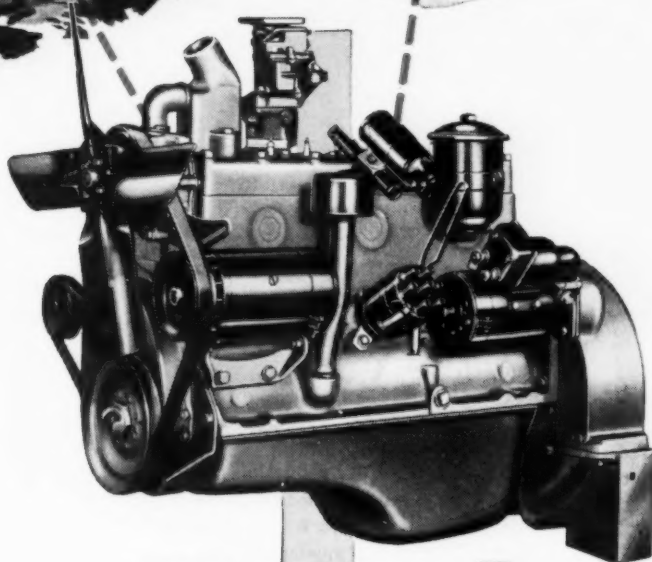
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**MODEL INDUSTRIAL 5**  
SIX CYLINDER

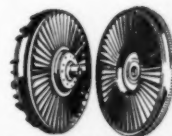
Bore 3¼". Stroke 4¾". 217.7 cubic inches displacement. Engine assembly comes equipped with 6-volt electrical equipment, 4-speed transmission, 19" four-blade suction fan, dustproof distributor and oil bath air cleaner. Generally used in powering tractors and other mobile industrial units for economy and dependability.

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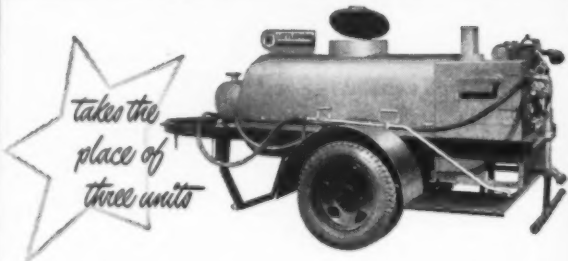
**HORSEPOWER WITH A PEDIGREE**



MODELS AVAILABLE  
WITH *gypol*  
FLUID COUPLINGS

*for low-cost road maintenance use*

# LITTLEFORD 101 UTILITY SPRAY TANKS



**FOR A UTILITY UNIT** to do Road Maintenance work the Littleford No. 101 was designed to do just that. Here's an outfit that can do the work of three units—it has a spray bar for doing small application jobs, a hand spray attachment for doing patch work and a pouring pot outlet for doing patch work or crack filling. This 101 Unit has a fast heating system including U type heat flues with Littleford Vaporizing Torch Burners. The No. 101 will handle Asphalt, Tar, Emulsion, Road Oils or Cutback. Made in sizes to fit any road maintenance job. For further details see your nearest Littleford distributor.

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Asphalt Supply Tanks  
No. 101 Utility Spray Tanks  
84-HD Asphalt Kettles



## LITTLEFORD

LITTLEFORD BROS., Inc.

454 East Pearl St., Cincinnati 2, Ohio

Original construction of quay walls provided berthing space for sixteen 10,000 to 15,000 ton vessels. The general design of the walls consisted of five layers of precast concrete blocks laid up in columns which extended to within 10 to 11 inches of the water surface. Upon the top blocks, a concrete coping had been placed which extended two meters above the high tide mark. Demolition charges placed about 25 meters apart along the quay walls, dislodged and disintegrated blocks weighing 35 to 80 tons each. When the Engineers arrived, there was berthing space for only two fair-sized vessels.

An underwater survey indicated the possibility of replacing the damaged and destroyed blocks with new blocks on the original alignment; but at one quay wall it was decided to build a new wall 6.5 meters seaward from the old wall, as the adjacent warehouses were located too close to permit excavation and replacement of backfill.

The harbor floor was cluttered with debris which ranged from large vessels to sabotaged equipment. The dry docks and gates had been damaged and the docks were filled with heavy wreckage. From the wreckage of harbor equipment two heavy-duty cranes were rebuilt, while floating cranes, which had been imported by the Greek Ministry of Supply were drafted into service. An area was cleared, casting of new quay wall blocks started with cement and aggregates purchased locally, and a traveling jack crane for hoisting and conveying the blocks was designed and fabricated in Greece.

The large and small dry docks and the pumping well were cleared of debris and pumped dry, and by June, 1948, were in condition to receive ships for emergency repair by use of a floating caisson gate. With the operations now completed, 17 large vessels may berth in the port, occupying quay space of about 600 feet per ship.

Damage to the ports of Salonika and Volos, while similar to Piraeus, was not quite as extensive. Work at Salonika consisted of removal of 182 linear meters of damaged breakwater, and relocation and construction of 678 linear meters of new breakwater, involving removal and replacement of 142,000 cu. meters of stone fill and concrete. In addition, 640 linear meters of quay wall required reconstruction, and debris and wreckage adjacent to the quay wall had to be removed. At Volos 356 linear meters of the city pier quay walls were destroyed, and 60 linear meters of the break-water. The harbor also required dredging.

### 1400 Km. Road Job

The highways of Greece were not built for modern motorized traffic and were in a deplorable condition from lack of maintenance. Of the 10,500 Kms. of national highway system, 8,000 Kms. had deteriorated so badly that vehicles could use them only when traveling very slowly. Fortunately road beds which have been used for centuries form a solid foundation. But deterioration due to constant use by trucks and non-tired carts precludes patching over most of the road surface, and it is usually necessary to scarify the entire road bed and to replace the wearing surface.

★ Before and After—restoration in progress on one of the many wrecked railway bridges



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★ Improvised sheepfoot roller outfit, on the Sedes airport

Reconstruction of the entire highway system was a monumental task far beyond the scope of the Aid Program. It was decided that the road program should include only those highways most essential to the economic and military requirements of Greece. 1800 Kms. of roads were selected for reconstruction. This consists of 928 Kms. of stationary-plant hot-mix asphalt surfacing, 658 Kms. of gravel-plant cold-mix asphalt surfacing and 214 Kms. of penetration asphalt surfacing. The program was later reduced to 1408 Kms. as increased guerrilla activities made it impossible, without great risk of personnel and plant, to carry on operations in certain areas. As an example of the difficulties encountered in these areas, guerrillas in one raid destroyed an asphalt plant and quarry and road equipment valued at \$90,000.

The seven railroad systems which service Greece represent a total of 2,679 Km. divided 1,477 Km. of standard gauge, 1,085 Km. 1.00 M. gauge, 22 Km. 0.75 M. gauge and 95 Km. of 0.60 M. Greek railroads were subjected to intensive demolition. When Greece was invaded in 1941, the Greek railways had ample rolling stock and equipment to meet the transportation needs, and its trackage was well maintained. Present inventory and equipment on order under the aid plan will give the railroads a total of 30% of their prewar equipment, much however in need of repair.

#### Brallo Tunnel Reconstruction

The Hellenic State Railway system, longest standard gauge line in Greece, extended from Athens north. The southernmost major war demolition was performed some 2000 Km. northwest of Athens, near Gravia and Brallo. The line here passes through the 2-kilo long masonry-lined Brallo Tunnel and over bridges spanning

★ Patching crew on Grecian road—compressed air used for final cleaning prior to bituminous patching



B. Perini & Sons Inc. used  
**6 Buffalo-Springfield 3-Axle Tandems**  
on Maine Turnpike!



Over 40 miles of smooth-riding blacktop surface laid by B. Perini & Sons Inc., Framingham, Mass., on the Maine Turnpike was rolled with 6 Buffalo-Springfield 3-Axle Tandems. On this job, as on many others, the 3-Axle Tandem produced smoother surfaces with fewer passes than any other type of roller on the job. Working two shifts a day and except for routine inspection, these rollers kept going with no down time—further proof of Buffalo-Springfield ability to "out-perform" on the toughest jobs.

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● Universal builds stationary and portable plants to meet any washing need. "Basic Unit" construction means lower initial cost, and "Stream-Flo" engineering assures a well balanced, smooth operating plant. Result—more yards per hour at less cost per yard. For profit-making production of clean, properly sized aggregate, investigate Universal.

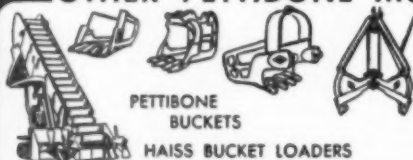
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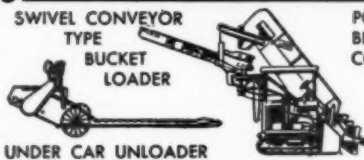


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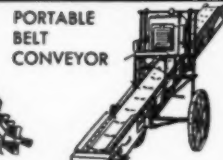


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LOADER



SWIVEL CONVEYOR  
TYPE  
BUCKET  
LOADER

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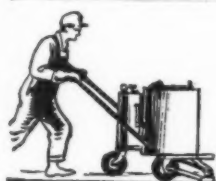
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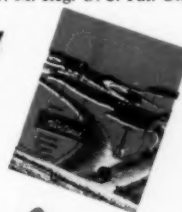
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# Flintseal

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JOINT-SEALING COMPOUND**

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precipitous ravines. Three heavy demolition charges successfully blocked the tunnel and so weakened the silty material through which it was driven that re-opening created a major problem. In all, 33 railroad bridges required reconstruction before normal service could be established. Of these, 12 were fabricated in the U. S. and 21 reconstructed from salvaged material or by utilizing prefabricated Everall bridging.

Demolition of Brallo Tunnel had been accomplished by three well spaced charges. Five-segment sets composed of 12 x 12 timbers spaced 3 to 4 ft. apart, supported by 12 x 12 timber posts, are being installed and will be



★ The famous Corinth Canal was one of the first restoration jobs—these scenes taken during removal of slides and after opening to ship traffic



embedded in a reinforced concrete lining. The tunnel grade is such that a full head of water had ponded behind each of the blocks, requiring drainage ahead of excavation.

Gorgopotamos Bridge originally comprised seven spans, five of which were demolished. Everall spans were used to repair the damage. In addition, one masonry pier and two British steel Tee-type towers were constructed.

#### Corinth Canal Solution

The Corinth Canal, which cuts the Isthmus of Corinth at its narrowest point, is unique in construction. The Isthmus is a strip of land about 4 miles wide which connects the Peloponnes and Attica. The material through which the canal is cut consists of marine deposited soils containing considerable lime. The canal was started by the Societe Internationale due Canal Maritime de Corinthe in 1882. In 1892 the canal was taken over by the Greek Corinth Canal Company and was completed in 1893. Until 1913 when the Panama Canal was built, this canal was the greatest cut of its kind in the world, having a maximum depth below natural ground surface of 86 meters. In order to hold excavation to a minimum, the slopes of the canal were made as steep as possible and were adjusted as excavation disclosed the nature of the materials. The steepest slope is 10 vertical on 1 horizontal and is 246 feet high.

Thirteen natural slides have occurred over a period of 54 years but the greatest of these were minor compared to the results of German demolition efforts. In addition to the earth and rock constituting the slides, great amounts of bridge wreckage, locomotives and railroad cars were dumped into the canal at points where they increased the difficulty of slide removal.

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You'll note the difference, too . . . in smoother operation that cuts fatigue and engine wear. In more dependable starts and stops. And in extra service between tear-downs. Because Velvetouch all-metal clutch facings and brake linings are heavy-duty built to give you longer wear, more uniform performance. They can't rot in oil . . . are not affected by moisture. They run cooler . . . install easier . . . and actually cost less on the basis of work done. Specify genuine Velvetouch on your next order . . . and get the operating advantages found only in all-metal construction.

25 years of service • 1924-1949

Approximately 675,000 cubic meters of excavation and dredging were necessary to place the canal in usable condition. The material was moved by dredges, draglines, self-propelled barges and trucks. As an indication of the difficulty in obtaining equipment, a 70-year-old dipper dredge salvaged after two years under water was used. The canal was opened for use in September, 1948.

### Ten Airfield Projects

Ten airfields have been included in the rehabilitation program. Work differed at the various fields but in general consisted of laying pierced steel plank runways and taxi strips on gravel base, repairing existing runways, construction of parking aprons and control towers, and rehabilitation of lighting and drainage systems.

Wherever practicable, work has been subcontracted to Greek contractors, in line with the general policy of revitalizing Greek industry and economy.

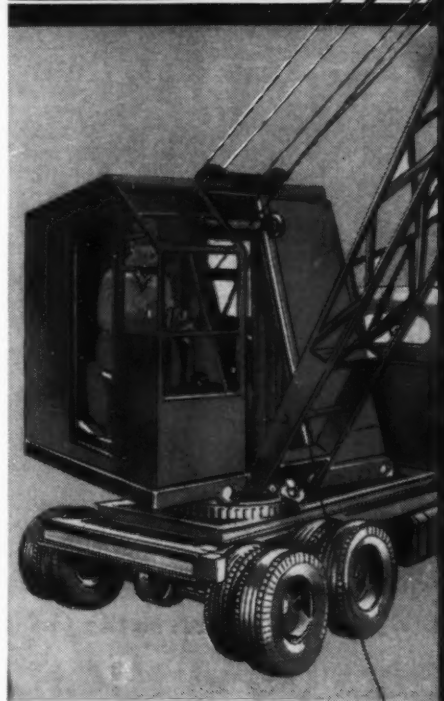
Greek labor has been trained and utilized where feasible. American personnel has been limited to supervisory personnel and skilled labor not available in Greece.

At the start, progress was hampered until sufficient construction and automotive equipment and materials could be procured and transported to Greece. Equipment started to arrive in December, 1947, but inclement weather prevented immediate full-scale operations. However, except for the guerrilla activity and certain critical materials, the program would have been completed on schedule, September, 1948.

Lack of security caused by guerrilla activity has been the most serious impediment. The highway, railroad bridge and tunnel projects have been subject to continued harassment. In spite of frequent work stoppage, the shelling of operation areas by artillery, traveling upon mined highways and working in mined areas, and other unpleasanties peculiarly incident to guerrilla war, the esprit de corps and morale of personnel has been superior. Though Greece is a nation engaged in an internal war, both Engineer and Contractor personnel must work unarmed. The guerrilla strategy has appeared to be that of intimidating the Greek workers and maintaining, in most instances, a passive resistance to American personnel and United States aid, confining overt acts to sabotage of construction, equipment and rebuilt facilities.

While the foregoing program was initiated by the U. S. State Department under Public Law 75, the work is being carried to completion under the Economic Cooperation Administration.

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Every "QUICK-WAY" part will deliver its capacity rating and more, and you get more utility out of a "QUICK-WAY" fully equipped, than any comparable equipment. Each "QUICK-WAY" is easily converted in minutes from shovel to crane, dragline, clamshell, pile driver, scoop, trench-hoe or backfiller. Buy just the attachments you want to do more jobs better.

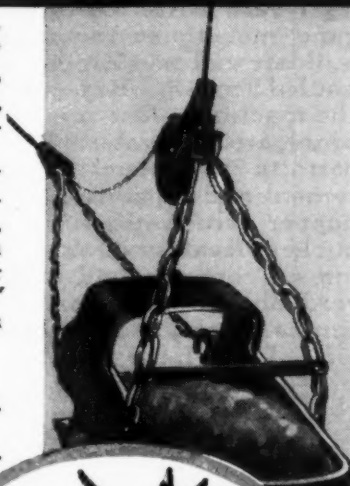
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**MODEL E:** 4/10 cu. yd. cap.  
mounts on any standard 5-ton truck.

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mounts on any standard 1½-ton truck.

Capacity in a truck shovel is fundamental . . . but it isn't enough. Check your requirements against all the advantages "QUICK-WAY" offers:

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**5 FLOORS • 5000 YDS • HIGH TEST CONCRETE**

**T**HIS Erie Portable Concrete Plant discharges each 1 yard batch to tubular tower, keeping buggy gang moving at top speed just behind the form builders and reinforcing bar teams. Aggregates are hauled 9 miles. Bag cement is stored under cover at the machine. One man operates weigh-batching of aggregate and water. Hydraulic control of all gates permits finger touch action. Second man feeds bag cement and supervises aggregate unloading to truck hopper which discharges to 60 ton/hr. vertical bucket elevator. Owner reports "a substantial saving on concrete laid will be effected on this 5,000 yard job". Mounted on 8 pneumatic tires the plant can be quickly knocked down and towed to the next job. Let's have your concrete making problem.

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Write for specific data on the Erie Portable Concrete Plant for your work.

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General view of Trico Plant showing 2nd floor of concrete being laid. The Portable Concrete Plant next to the building does not obstruct traffic.



# Airport concrete made with \***DURAPLASTIC** still in excellent condition despite **6 years'** traffic and exposure



**CHICAGO ORCHARD AIRPORT** (formerly Douglas), Park Ridge, Ill. Designed and supervised by U. S. Engineers and The Austin Company; Contractors: Standard Paving Company, White Consolidated, Inc., and Thomas McQueen Company.

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\*"Duraplastic is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

RS-D-87

**PLACED IN 1942-3**...subjected to the heavy traffic of war and peace...and the rigors of six tough winters...the concrete runways, taxi-ways and parking aprons of this veteran airport remain durable and highly scale-resistant.

Atlas Duraplastic air-entraining portland cement was used exclusively on the job. Characteristically, it required less mixing water for a given slump. The resultant mix was more plastic, more cohesive, more workable, more uniform. Entrained air cells created in the concrete by Duraplastic cement minimized segregation and bleeding...fortified it against freezing-thawing weather...and provided the extra durability now in evidence after 6 years of rugged wear and weather.

Using Duraplastic cement calls for no unusual changes in concrete placing procedure, merely the same care and workmanship regularly employed. Duraplastic costs no more than regular cement and complies with ASTM and Federal specifications. For further information, write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

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AIR-ENTRAINING PORTLAND CEMENT

**MAKES BETTER CONCRETE AT NO EXTRA COST**



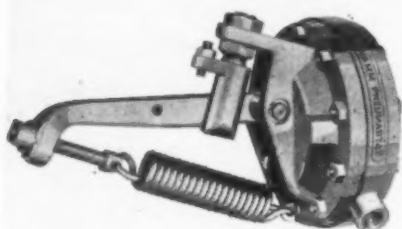
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## New Construction Equipment and Materials

### 500 Speed Regulator for Compressor

A new feature on the complete line of portable engine-driven compressors in sizes including Models 105, 210, 315 and 420 of Schramm, Inc., West Chester, Pa., is a unit designed to regulate the speed of the compressor in accordance with air demand. This unit is known as the Schramm Pneumastat. As the pressure increases, the Pneumastat adjusts itself



Schramm Pneumastat

to balance the throttle in a new position, thereby reducing the speed of the compressor. With this arrangement the compressor operates continuously from about one-half to full capacity with loading and unloading, thereby eliminating at part load, the cycling between full speed and idle speed.

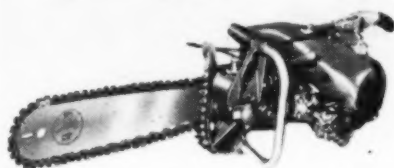
### 501 Brush Control Chemical

A new chemical compound, stated to have been proven by tests to be one of the most potent weapons yet found for brush control, has been developed by the Agricultural Chemicals Division of The Sherwin-Williams Co., Cleveland, O. The new discovery is a specially formulated alkyl ester combining 2,4 D (2,4 Dichlorophenoxy Acetic Acid) and 2,4,5-T (Trichlorophenoxy Acetic Acid) called "Sher-

wilil," the chemical mixes readily with water for convenient handling and has a highly lethal effect against poison ivy, poison oak, poison sumac and nearly 60 other types of woody plants that constitute 95 percent of the brush control problem. Sherwin-Williams research chemists say this new product makes it possible for the first time to eliminate brush at a low cost without continuous, heavy and repeated re-growth problems that accompany mechanical clearance. Too, the product has none of the disadvantages of poisonous sterilizing and contact chemicals and creates no fire hazard.

### 502 Chain Saw

New model Hornet chain saws have been announced by Southern Distributing Co., Front St. and Central Ave., Cincinnati, O., the American representatives of Hornet Industries, Ltd., Guelph, Ont., Canada. There are two Hornet models, the model DJ, a one-man saw weighing



New Model Hornet Saw

approximately 32 lb., and the model D, a two-man saw weighing approximately 60 lb. The one-man model DJ comes in 16 in., 20 in., 24 in., 30 in., and 36 in. sizes in the open end blade and 24 in., 30 in., and 36 in. sizes in the tailstock blades. The model D saw for two-man operation has 24 in., 30 in., 36 in., 48 in., 60 in. and 72 in. blade sizes. Both machines cut

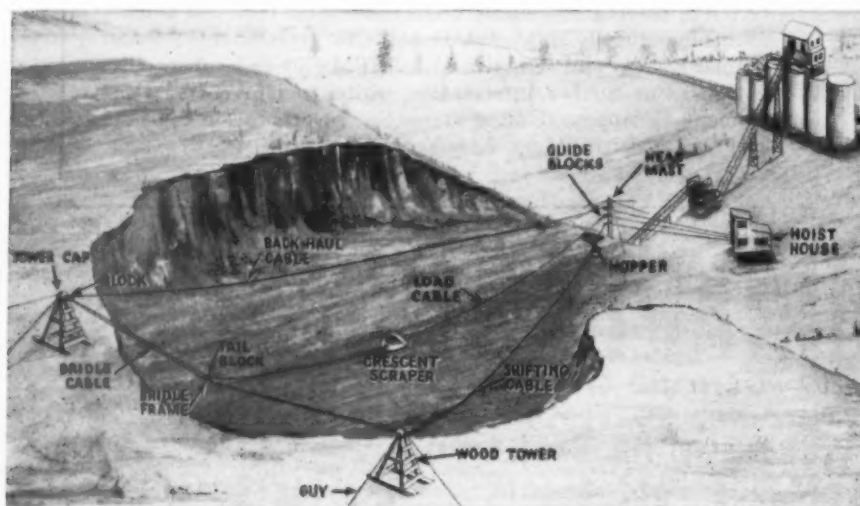
very close to the ground; the blade swivels 180° and may be locked in any desired cutting position or angle.

### 503 Power Take-Offs

Because of continuing high demand and an easing up of the materials situation, the Hercules Steel Products Corporation, Galion, O., has resumed production of its split shaft power take-offs, discontinued for some time due to shortages. Now assured of ample raw materials to take care of the production of parts as well as complete units, the company again offers direct, offset, side and dual drives for long and short wheelbase trucks. These take-off units are used for transmission of the full horsepower and torque of the truck motor for operation of air compressors, electric welders, winches, pumps, rock crushers, cement mixers, grain separators, hay balers, hammer mills, drills, portable refrigeration units and other truck-mounted equipment.

### 504 Power Scraper Machines

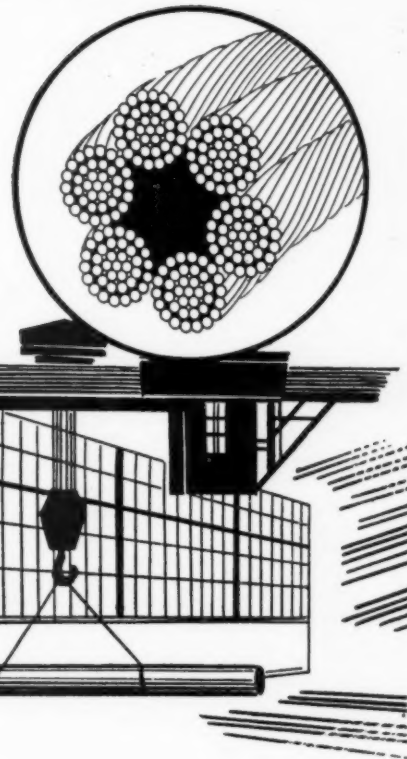
When a power drag scraper is used for excavating hard-packed material or for making wide, clean cuts in grading land or stripping overburden, it is necessary to provide a means for rapid shifting of the tail end of the machine. Sauerman Bros., Inc., 588 S. Clinton St., Chicago 7, Ill., now offer a new series of power drag scraper machines in sizes from 1/3 cu. yd. to 4 cu. yd. that are designed and equipped to afford automatic rapid shifting. The new units, known as Sauerman rapid-shifting scraper machines, give the operator, stationed at the scraper hoist, complete automatic control of shifting the tail end of the machine. This permits the operator to spot the scraper bucket instantly wherever he wishes, thus saving time and assuring better results when excavating non-caving materials or doing any work requiring constant shifting of the line of travel of the bucket. The heart of the rapid shifting machine is the Sauerman three-drum hoist and elevated tail bridle assembly. A bridle cable is stretched between two tail towers, and on the cable rides a bridle frame for the tail block. The third drum of the hoist moves the bridle frame in one direction, the pull of the outhaul cable pulls it in the opposite direction, and the drum brake holds it positioned as desired. Each machine is furnished with a gasoline, Diesel or electric driven, three-drum, roller bearing hoist. The normal specifications call for cable spans ranging from 200 ft. for the small units up to 400 ft. for the largest units. These spans can be extended considerably if required. Timber tail towers are furnished by the purchaser, but Sauerman will supply tower caps and drawings to help in their construction.



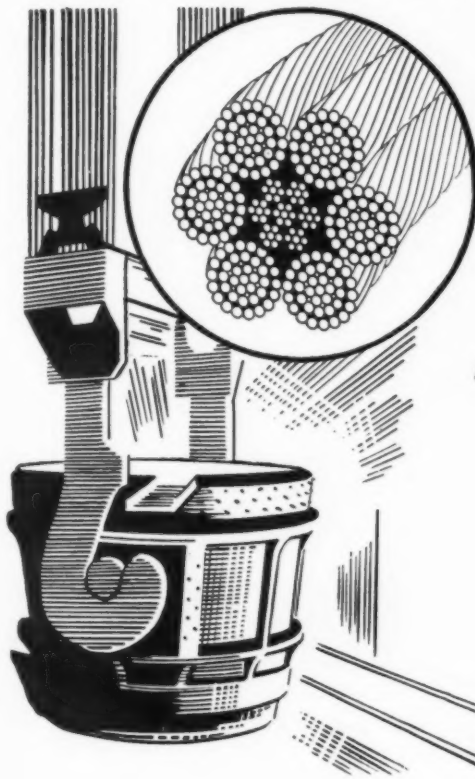
New Sauerman Rapid-Shifting Scraper Excavating Hard-Packed Gravel Deposit

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IT IS FLEXIBLE AND RESISTS  
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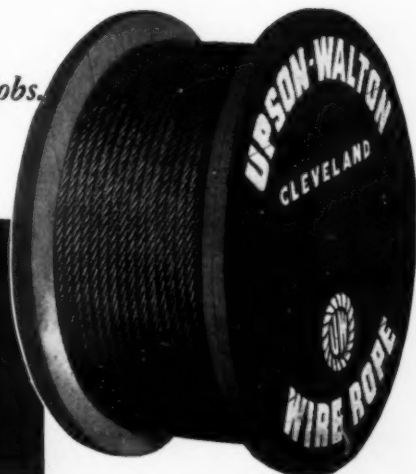
Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth

Main Offices and Factory: Cleveland 13, Ohio

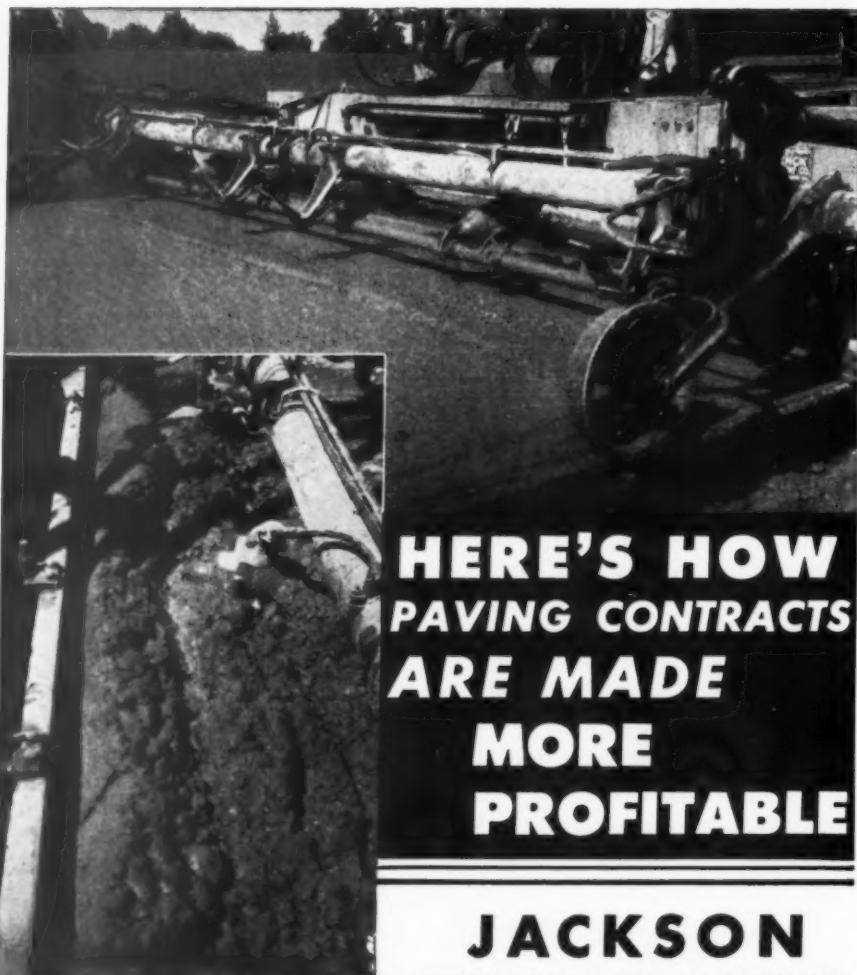
114 Broad Street  
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When writing advertisers please mention **ROADS AND STREETS**, May, 1949



**HERE'S HOW  
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## **JACKSON VIBRATORY PAVING TUBES**

quickly make plastic the stiff, drier concrete mixes which effect up to 10% cement economies. Concrete at forms and joints is puddled perfectly, thus saving hand vibrating. Spreading costs are reduced and finisher progress is much more rapid. Complete compaction and excellent finish is obtained. Perfectly adaptable to slabs 6" to 24" thick and for regular single or two-course construction. Easily adjustable in the field (with proper accessories) from 10 ft. to 25 ft. slab-widths. Quickly attached to any standard finisher. Ample reserve power to off-set fast drying and setting conditions. Effortless controls for finisher operator.

A constantly increasing number of highway engineers are specifying full slab-width internal vibration. Get the complete facts in time to be in line and profit in '49. Write, NOW!

### **OTHER MONEY-MAKING PAVING EQUIPMENT**

Jackson Municipal Paving Unit (Manually guided electric vibratory screed and power plant); Jackson Side Form Vibrators for attachment to standard finishers or spreaders to eliminate manual vibrating; vibrators for every type of construction.

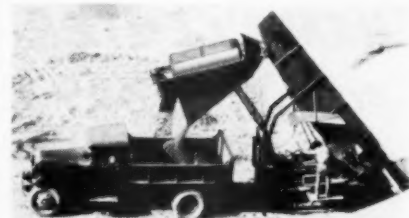
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BY  
ELECTRIC TAMPER  
AND  
EQUIPMENT CO.  
—FOR—**

**JACKSON VIBRATORS, INC., LUDINGTON, MICH.**

**505**

### **Rotary Screen Loader**

A new automatic rotary screen loader, introduced by N. P. Nelson Iron Works, Clifton, N. J., separates sand and gravel as it digs and loads into trucks. The unit consists of a Nelson rotary screen mounted on a self-powered Nelson Model Q-10 heavy duty bucket loader. The rotary screen is constructed of steel plate-channel framing and abrasion-resisting wire mesh screen. In operation, the screen is synchronized with the bucket conveyor of the loader. Two chutes at



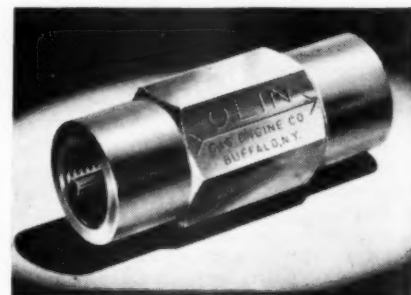
**Nelson Automatic Rotary Screen Loader**

right angles direct the flow of separated materials. When digging and loading materials that do not require screening a throw-out clutch enables the operator to disengage the screen and deflect material through the lower chute. Screening capacity of dry mixtures is stated to range from 1 to 2 cu. yds. a minute, depending on the size of the screen openings and the mixture of the material. The Nelson Q-10 bucket loader, on which the rotary screen is mounted, features the exclusive Nelson steel-toothed feeder that picks before it shovels.

**506**

### **Air Line Shutoff Valve**

An automatic safety shutoff valve for use on compressed air lines is being manufactured by the Olin Gas Engine Co., 9 Lafayette Ave., Buffalo, N. Y. Made to fit standard connections, it is inserted at the intake end of the air hose. When a break occurs in the hose the valve closes instantly and shuts off the



**Automatic Shutoff Valve**

pressure, permitting only a light stream of air to escape through a by-pass. This eliminates the danger of accidents caused by breaking lines and avoids the necessity of turning off a valve to make repairs. When the hose is repaired the pressure will equalize and the valve open automatically. It also permits the changing of tools without shutting off a valve at the air line.

**507**

### **Chain Saw Blades**

A new range of blade sizes has been announced by McCulloch Motors Corporation, Los Angeles, Calif., manufacturers of power chain saws. Blades now available are 20, 30, 40, 50, and 60 in.

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80 in.

**DIG REAL  
DIVIDENDS!**

## **WELLMAN** *Williams Type* **Welded Buckets**

Operators prefer the Wellman Bucket for its balance, easy handling, and digging power. Owners prefer the Wellman Bucket for its bigger payloads, lower maintenance cost. These features are not accidental. Wellman pioneered in welded construction of rolled steels which make these buckets lighter, stronger, for greater yardage at lower costs. In all types and sizes, you'll do better with a Wellman!

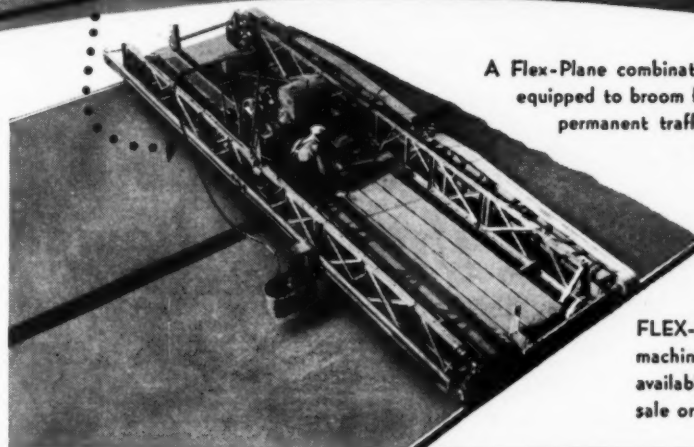


There's a  
**Wellman Bucket**  
for every service

**THE WELLMAN ENGINEERING COMPANY**  
7003 CENTRAL AVENUE CLEVELAND 4, OHIO

## **MECHANIZE BEHIND THE FINISHER**

• With Flex-Plane equipment you can mechanize the entire paving job . . . the modern high speed Flex-Plane finisher needn't out-distance the miscellaneous "end" jobs. The Flex-Plane mechanical tie-bar and dowel spotter, the vibratory joint machine and the combination spray machine will crowd the fastest paver. The completely automatic combination machine can broom, belt or drag burlap, install permanent traffic lines and spray cure. Don't let outmoded methods retard jobs nor run away with costs. For full information, return the coupon from this ad.



A Flex-Plane combination machine equipped to broom finish, install permanent traffic lines and spray cure.

**FLEX-PLANE**  
machines are  
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### **COMBINATION MACHINE:**

- BROOMS, BELTS OR DRAGS BURLAP
- INSTALLS PERMANENT TRAFFIC LINES
- SPRAY CURES

Send me full information on:

- ☐ Flex-Plane spray and combination machines.
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Company

Address

Mail to **FLEX-PLANE, Warren, Ohio**

**FLEX-PLANE**  
WARREN OHIO

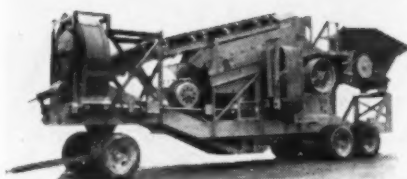
(FLEXIBLE ROAD JOINT MACHINE CO.)

in length. All sizes of blades, as well as the 20-in. bow-saw attachment, are interchangeable on the same special 5-hp McCulloch power unit. The new blades are manufactured from tool steel, chrome plated to resist rust. The chain track is accurately milled in the blade. To assure extremely accurate placement of the chain track, each blade is surface-ground on both sides before the track is machined.

508

### Crushing Plant

A new one-unit portable outfit, announced by Universal Engineering Corporation, Cedar Rapids, Ia. (Division of Pettibone Mulliken Corporation, Chicago, Ill.), is a new arrangement of three primary components—the Universal roller bearing jaw crusher, the Universal roller



Universal One Unit Portable Plant

bearing hammermill and the Universal Simplicity gyrating screen. With these, clutch controlled folding conveyors, rotator and necessary driving connections are all mounted on a single chassis, making the plant complete and highly mobile. The plant is shovel fed. Provision is made to power the hammermill separately. This will permit of a variable speed so as to suit the operation to the nature of the rock being crushed and

the kind of finished product wanted. The rest of the plant is driven from the crusher. Power is transmitted to the hammermill and crusher through special countershafts and Universal joint connections. The hammermill will receive up to 5 in. stone. The jaw crusher may be set to whatever size is needed for proper balance with the hammermill. A large, three deck gyrating screen with gates at the discharge end, grades the crushed stone into one, two or three sizes.

509

### Truck Service Tool Set

A specialized service tool set developed particularly for Autocar trucks, but usable also on other makes of trucks, has been announced by Owatonna Tool Co., 319 Cedar St., Owatonna, Minn. It includes tools for removing and installing

Body Illustrated: Model RB-70, standard 7 cu. yd. rock body, specially constructed for quarry and rock work. Made in all capacities. Mounted over standard double-lift arm type under body hoist or telescopic hoist, depending on capacity and use.



## Keep ahead of schedule with "On The Job" Design

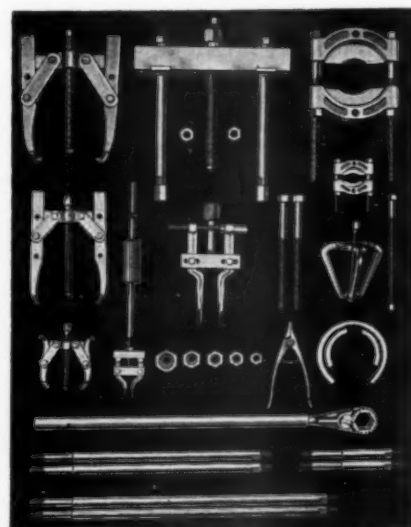
In Marion Bodies and Hoists you get dependable loading, hauling and dumping performance that keeps you "loads ahead." With "On The Job" design you get sturdy construction features developed by Marion engineers in the field under actual operating conditions.

Ask your Marion Distributor about the Marion unit designed "on the job" to meet your special requirements, or write direct.

**MARION**  
DUMP BODIES and  
HYDRAULIC HOISTS

GET MORE DETAILS NOW  
Just mail a post card or letter for the complete Marion catalog, or ask your Marion Distributor.

MARION METAL PRODUCTS CO., MARION, OHIO



Service Tool Set

tight-fitting parts such as bearings, outer bearing races, bushings, gears, shafts, etc., quickly and without damage to expensive parts. The basic pulling tools are adjustable to cover a wide range of sizes, eliminating the need for a large number of special tools.

510

### Grader

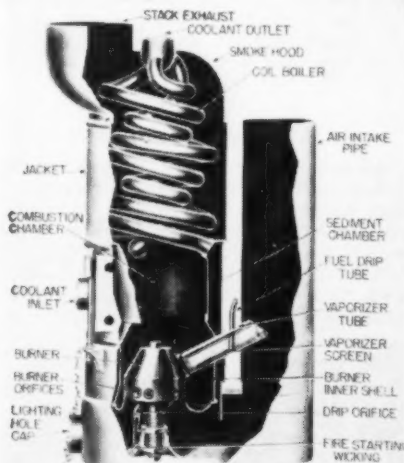
A new light grader, announced by The Gledhill Road Machinery Co., Galion, O., features primarily the longer (or higher) reach of the blade (8 ft., 9 ft., or 10 ft.) and simplified leaning wheel construction. Among other features are its (1) pneumatic tires, (2) self-locking raising and lowering device (3) automotive type steering gear, (4) all gears in oil tight cases, and (5) Timken tapered roller bearings.



Gledhill "Hi-Lift" Grader

## 511 Heater

A coolant heater, announced by Vapor Heating Corp., 4501 W. 16th St., Chicago, Ill., does two things, heats and circulates the cooling system solution during the night or when the truck, bus, tractor or diesel power plant is not being used. When turned full-open the heater uses about 1 quart of gasoline an hour and develops an output of over 15,000 B.T.U. an hour, the valves and fuel controls will operate in very cold conditions of 50° below zero. The heater is easily lighted with a torch and reaches full

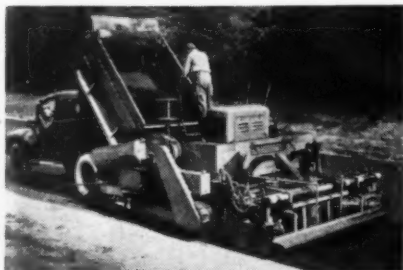


Vapor 4901 Coolant Heater

output in two minutes. Circulation of the cooling system solution is accomplished in this manner, about 10% of the cooling system solution is directed into the three copper coils in the heating chamber and turned into steam, the steam heats and circulates the solution by ejecting through two venturi nozzles, thus eliminating the need for a current-consuming circulating pump. Where severe cold weather conditions are encountered, water jackets may be placed under the battery and crankcase keeping these parts of the motor warm as well as the block, head and radiator. The heater is small enough to be installed under the hood. It is 18 in. high x 5 3/4 x 9 3/4 in. and weighs 33 lb.

## 512 Bituminous Paver

The improved BP-5 bituminous paver announced by Jaeger Machine Co., Columbus 16, O., lays any width of paving between 5 ft. 8 in. and 12 ft. 6 in. without removal or insertion of any parts. It also is stated the paver can lay 25 ft. pavement in two lanes without special attachments. It is almost instantly adjustable for any width between 9 ft. and 12 ft. 6 in. by merely turning a handwheel and without stopping the machine. Width settings from 5 ft. 8 in. to 9 ft. are made by merely turning levers that control block-off gates.



Jaeger BP-5 Bituminous Paver



Gorman-Rupp pumps in action on storm sewer job in Corpus Christi, operating at 20 ft. suction lift. Jay DePuy and E. C. DePuy, contractors, are using 14 Gorman-Rupp's on this job.

# ON-THE-JOB -- *Performance* IS WHAT COUNTS!

When you're keeping a hole dry or holding a river back, priming speed, efficiency and dependability of your pump means everything.

Gorman-Rupp self-priming centrifugal pumps can help you complete your contracts on time and at a greater profit. They challenge any contractors' pump, size for size, to equal their all around performance.

We invite you to give these new Gorman-Rupp pumps an ON-THE-JOB test for your own satisfaction.

We back our claims with a money back guarantee.

Made in all sizes: 7M - 10M - 15M  
20M - 40M - 90M - 125M

Ask for the new Contractors' Bulletin No. 8CP-11



**THE GORMAN-RUPP COMPANY**  
MANSFIELD, OHIO

Center and rear screeds oscillate at 900 strokes per minute, have beveled front edges that are V-grooved in the direction of travel. The screeds are tiltable—either the leading or trailing edges may be raised. Quick crown changes ranging from 2 in. convex to 1 in. concave are achieved by cranks located above the screeds. Big tractor crawlers support all weight except that of the screeds and the long equalizing runners which ride on the base course or sub-grade. Weight of the machine and effect of its traction are never on the material being laid. The 6-ton hopper insures ample material for continuous operation, as fast as trucks can deliver. Dual conveyors, independently and closely controlled through hydraulic clutches, carry material from hopper to screeds. An agitator-distributor breaks up, reffuffs and spreads the material evenly across center

screed width. Material channels at both sides provide material for the rear screeds. Screeds are heated by hot air, making them burn-proof—and have hydraulic lifting devices. The machine offers users eight working speeds, ranging from 5 to 50 fpm. Road speeds range from .8 to 2.0 mph. Power is from a 6-cylinder, radiator-cooled gasoline engine of 37.5 hp at 1600 rpm, with throttle and governor control.

### 513

#### Highway Sprayer

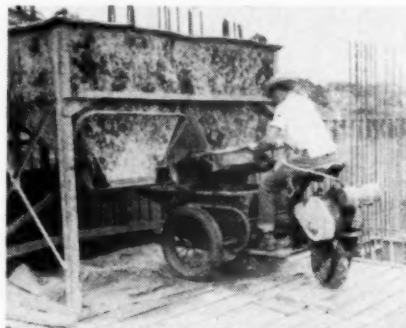
A new line of SprayRite sprayers, developed by Fabricated Metals, Oakland, Calif., was designed specifically for the rapid, uniform application of concentrated weedicides. Principal performance features claimed for the new equipment are true one-man operation, positive

dripless shut-off, automatic nozzle cleaning, interchangeable booms, and centralized control giving the tractor or truck driver "finger tip" control over spraying operations at all times. The new units are designed for quick "one-piece" installation on all popular makes of wheel tractors, and are also available in skid-mounted models for use on flat-bed or pick-up trucks. Sturdy booms are hinged to swing up and back to clear abutments, line posts or guard rails. Booms return automatically to spraying position after clearing obstacles. Boom height is quickly adjustable. Master control unit permits operator to spray from either or both booms. Tractor mounted units are powered from the tractor power take-off; skid mounted units are equipped with aircooled 4-cycle gasoline engines.

### 514

#### Power Cart

An improved model of its power cart, announced by Gar-Bro Manufacturing Co., 2416 E. 16th St., Los Angeles, Calif., incorporates several new features. A 7 HP 4-cycle gasoline engine enables the cart to climb 20% grades with a 2000 lbs. per load. All moving parts have been equipped with Timken tapered roller bearings re-



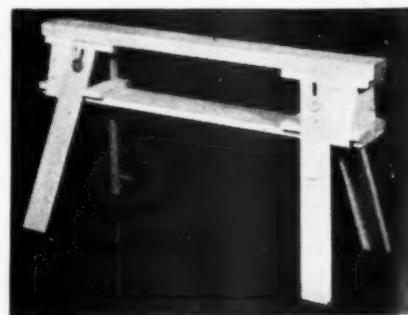
Gar-Bro Power Cart

quiring less frequent lubrication. New improvements have been made in the forward and reverse clutches giving additional life and smoother, easier operation. Also several changes in frame design make the improved model stronger without additional weight. Steering is done by a tiller which turns the rear wheel through a 180 degree arc enabling the machine to turn around on a 4 ft. radius, forward and reverse motion is controlled by the same tiller. Speed is controlled by a foot throttle.

### 515

#### Folding Workhorse

A new portable workhorse (patent pending), announced by Folding Workhorse Co., P.O. Box 63, Long Branch, N. J., has retractable legs that fold in to tuck under the top rail to produce a practical, portable piece of equipment. When folded, the workhorse measures



Folding Workhorse



## For Those Hard-To-Get-At Corners THE OSGOOD HOE

Powerful and easily maneuverable OSGOOD hoes dig deep and fast, dump clean. The all-steel reinforced boom provides

long reach and high dumping. The operator has clear vision and precision control of all



movements for quick and accurate spotting of the dipper. The power dipper trip saves time and energy. The OSGOOD is versatile, too; is easily converted from Hoe to Shovel, Crane, Dragline, Clamshell or Piledriver. Write for descriptive literature and specifications.

POWER SHOVELS • CRANES • DRAGLINES • CLAMSHELLS • BACKHOES • PILE DRIVERS

**THE OSGOOD CO.** **O-G** **THE GENERAL CO.**  
EXCAVATOR

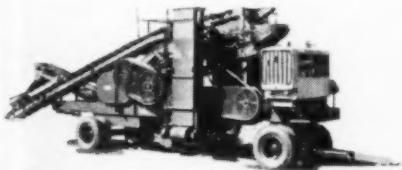
MARION OHIO  
DIESEL GASOLINE OR ELECTRIC POWERED • ¾ TO 2½ CU. YD. • CRAWLERS & MOBILCRANES

only 8 in. square by 3½ ft. long. Fool-proof non-mechanical operation based upon a special bolt permits instant setting up or folding away without any tools. Open, the workhorse stands 2 ft. high on a 3½ ft. length. Combination reinforcement bar and tool shelf produces maximum rigidity and strength. Precision made to support a 1,000 lb. load, the folding workhorse weighs only 15 lb.

516

### Gravel Crushing and Screening Plant

A completely new small gravel crushing and screening plant has been added to the line of portable duplex plants manufactured by Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn. Designated as the 17-V, this plant incorporates all features of the larger "Bottom Deck Feed" plants. New features



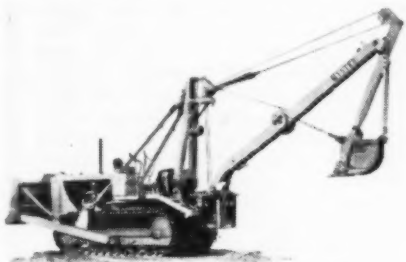
17-V Gravel Crushing and Screening Plant

include a swivel type feeder conveyor, 12 ft. 6 in. overall height; all drives on plant proper are either V-belt or tumbler shaft and gear box. Delivery conveyor folds at the side. Jaw crusher is 10 x 16 and the roll crusher 24 x 16. A 30 in. x 8 ft., 3½ deck vibrator screen provides 40 sq. ft. of effective screening area. The chassis is two axle with four 9:00 x 20 tires front and rear.

517

### Trench Hoe Attachment

First shipments are now being made by Hyster Co., Portland 8, Ore., of a ½ cu. yd. hoe front, newly added to the dragline, clamshell, and crane features of the Hyster Hystaway, attachment for use with



Hoe Front for Hyster Hystaway

"Caterpillar" track-type tractors. Installation of the hoe front on the D7 and D8 Hystaway can be accomplished without major alterations to existing machines. The hoe dipper has a cutting width of 33 in., and for narrow ditching requirements an optional dipper of 23 in. width may be substituted.

518

### Concrete Sprayer

A new concrete sprayer announced by Devere Co., Racine, Wis., has 8 spray heads which simultaneously treat a 6-ft. strip of concrete. An extra side nozzle is provided for spraying edges of concrete surfaces. Standard equipment also includes 50 ft. of hose, together with a single nozzle boom for spraying inaccessible places. Available as extra equipment is an adjustable boom which may be placed on



Devere Concrete Sprayer

bridges or carried by two men. Tank, pump and motor are mounted on an all-steel, two-wheeled chassis which is readily portable. The tank has a 10-gal. capacity with a relief pressure return to tank. The tank

is also of the self-loading type. The curing compound may be pumped directly from the barrel into the tank.

519

### Truck Mounted Shovel

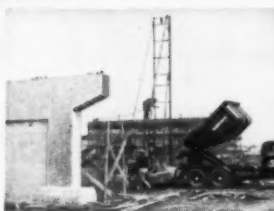
A new improved Bantam, called the Model M-49, announced by the Schield Bantam Co., Inc., Waverly, Ia., is offered with an independent spur gear drive boom hoist which permits the boom to be powered up or down, or lowered on the brake for fast operation. The Model is easily converted from shovel to trench hoe, dragline, clam, piledriver, or crane. It mounts on any 1½ ton truck chassis or larger and is also available on half-tracks. Engineering features include Timken tapered roller bearing mounting of jack, drum, and swing shafts. Drums, swing

## A NEW UTILITY BODY FOR THE NATION'S BIG HIGHWAY PROGRAM

The Low-Cost Dumpcrete



PAVING



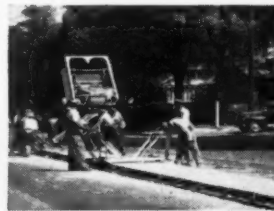
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SAND, GRAVEL, EARTH

If you handle a variety of paving jobs—Here's a proved way to get more yardage at less cost. Set up a central mixer (a paver or portable mixer) for close control of your mix. Then haul in the fast, low-cost Dumpcrete and place uniform loads.

If you handle big paving jobs—The low-cost Dumpcrete can pick up from your paver for off-the-slab pours . . . culverts, bridges, turnouts, sidewalks, curb-and-gutters.

About the Dumpcrete—It's a non-agitating concrete body designed especially to haul air-entrained concrete (a must for extra durability and workability). The Dumpcrete costs less to buy, to run and to maintain. It loads fast and places fast. Learn how it can cut your costs. Mail the coupon today. There's no obligation.



Send me facts about the cost-cutting Dumpcrete for paving work.

The lower cost Dumpcrete is lightweight, watertight, with 13-foot chute, controlled higher discharge and lower center of gravity. Hauls sand, gravel, and coal too. Available in 2, 3, and 4 yard sizes.



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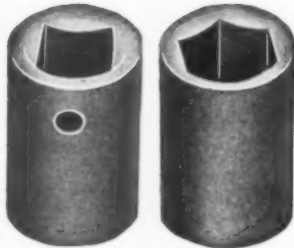
**DUMPCRETE**

DIVISION, MAXON CONSTRUCTION CO., INC.

543 Talbott Bldg., Dayton 2, Ohio

**SPEED  
PRODUCTION**  
with these  
**2 NEW TOOLS by**

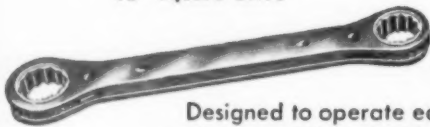
**OTC**



1/2" Square Drive

### OTC IMPACT SOCKETS

Forged for built-in strength and toughness to assure a high safety factor with power wrenches. Maximum clearance—comparatively thin walls, hexagon openings. 13 sizes—7/16" to 1 1/4" openings, with 1/2" Square Drive.



### OTC RATCHET BOX WRENCHES

Designed to operate easily in close quarters. Made of alloy steel for tough service. Five sizes of double end wrenches for many uses—1/4"x5 1/16", 3/8"x7 1/16", 1/2"x9 1/16", 5/8"x11 1/16" and 3/4"x7 7/8".

WHEN YOU NEED PULLERS - order OTC

LOOK for this Sign

OWATONNA TOOL CO., 319 Cedar St., OWATONNA, MINN.



The Second of a Series in the interest of more efficient use of steel... a vital American resource.



### Balanced strength and design REINFORCING BARS

While outmoded building codes may require hooks on reinforcing bars because of the need for anchorage and bond—for the first time in 30 years—newly developed ASTM specifications A305-47T for deformations, now assures definite anchorage with the attendant opportunity for more efficient use of steel by eliminating hooks and shortening length of embedment.

Laclede Multi-Ribbed Bars meet these specifications and are rolled to give the construction industry every advantage of steel through balanced design and strength. High yield point (in excess of 55,000 PSI) combined with maximum anchorage conserves steel tonnage for America as well as for the contractor.

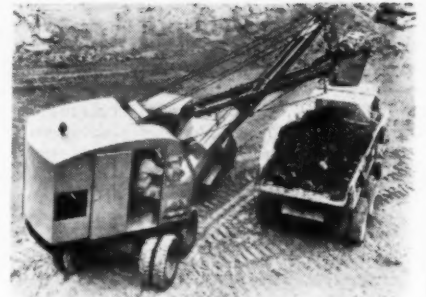
Laclede Multi-Rib Reinforcing bars give strength, anchorage and balance to reinforced concrete design.



Producers of  
Construction Steel

**LACLEDE STEEL COMPANY**

St. Louis, Mo.



Model M-49 Bantam

gears, and vertical swing shaft roll on pre-lubricated, sealed-for-life ball bearings. Sealed in triple roller chain drive runs in oil bath. All gears and pinions are machine cut, and parts subject to extreme wear are flame hardened. Internal expanding mechanical clutches are used on both swing and drum shafts. Improved hook roller design incorporates 3 larger adjustable cam-type hook rollers, and redesigned turntable rollers have larger axles and bushings. Machine cut bull gear is bolted in place and may be rotated if necessary to distribute wear.

### 520

#### Water Tank for Paver

A new water tank for its Duomix (dual drum) 34-E MultiFoote concrete paver has been announced by The Foote Co., Nunda, N. Y., subsidiary of Blaw-Knox Co. This tank is mounted on the side of the machine opposite the operator's platform with the other equipment making up the main water system. The tank will carry 650 gal. of water over and above the normal water supply of 210 gal. and provides plenty of capacity between tank wagon trips to avoid shutting down. Equipment includes a pump for handling water from wagon to tank.

### 521

#### Portable Electric Saws

Three sizes of portable electric circular saws called "Hi-Speed Saws" have been announced by Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y. No. 944 has 2-7/16 in. capacity, 7 1/2 in. blade, 4500 RPM, 17 lb. net weight. No. 964 has 2-13/16 in. capacity, 8 3/4 in. blade, 4500 RPM, 19 1/2 lb. net weight. No. 974 has 3 1/4 in. capacity, 9 1/2 in. blade, 3600 RPM, 24 1/2 lb. net weight. Use of these saws is not limited to wood. Blades are also available for cutting through nails, copper, brass, bronze, lead, tile, glass, brick, clay products, con-



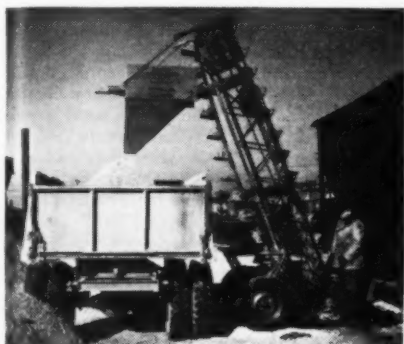
Hi-Speed Saw

crete, marble, flagstone, asbestos, cement products and Celotex. All sizes have the following features: Helical gears that permit high blade speeds without requiring frequent application of special lubricants. Depth of cut is easily adjusted from zero cut to full capacity. Angle of cut is adjustable from 35° to straight 90° cut. Automatic telescoping safety guard turns on ball bearings as do all other rotating parts. Blade is at worker's right, allowing saw to be used in same manner as a hand saw. Operator has clear vision of cutting line which is kept clean by air blast from motor's exhaust. Cuts within 1 in. of a wall are possible.

## 522

### Car Unloader

An important feature claimed for a new car unloader, announced by Markroy Co., Department RS-1, 6th and McCambridge, Madison, Ill., is the complete elimination of the need for a concrete pit at the trackside. In addition, the rail bed is not disturbed and removal of the unloader during movement of hopper cars is not necessary. The loader is a



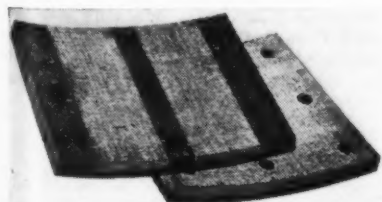
Markroy Car Unloader

bucket-type elevator of tubular steel construction and is stated to move material from hopper cars to truck or stockpile at the rate of 1½ to 2 tons per minute. The feeder unit is readily installed beneath the rails and between two ties whose spread need only measure 16 in. or more. Easily transported from job to job in a small pickup truck, it is one-man operated. Fully productive, continuous feed is stated to be assured by a patented gravity assisted feeder. Rate of material flow is accelerated in its downward movement through the feeder by means of a special eccentric that imparts an upward and outward thrust, thus activating the feeder pans and aiding and abetting the normal flow provided by gravity.

## 523

### Brake Blocks

The engineered combination of performance characteristics needed for each application is claimed for the new MW brake blocks announced by the Gatke Corporation, 228 N. La Salle St., Chicago 1, Ill. Originally developed to meet the



Gatke MW Brake Blocks

requirements of flame-hardened drums, MW brake blocks are a combination of the two main types of asbestos friction materials integrally moulded into unified brake blocks. This new development combines the qualities of woven asbestos and moulded asbestos materials in proper balance for the specific application. Variation in the compositions and the proportions of the two materials provides adjustment of characteristics to the service.

## 524

### Rubberized Asphalt Sealing Strip

A pre-molded para-plastic rubberized asphalt sealing strip, a new development by Serviced Products Corp., Chicago, Ill., is said to offer a simple and effective solution to the problem of watertight

sealing of vertical and overhead concrete joints. The strip is a development of this manufacturer's hot poured para-plastic, used in the construction of highways, airport runways, dams, bridges, tunnels, reservoirs, etc., wherever a water and vapor-tight seal of joints is desired. Research and actual field installations of the new sealing strip are stated to have proven its ability to effectively seal joints and maintain bond with concrete at zero degrees temperature. Time and labor savings effected because the sealing strip can be nailed directly to the concrete form are another important advantage claimed for the new material. To apply the strip directly to concrete, the para-plastic strip is heated until tacky and applied, or it may be prepared for application by freshening with kerosene or gasoline. Pre-molded para-plastic

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**BEFORE WINTER HITS**, you can easily weatherproof roads, patch, seal and give necessary wear-resisting protection to all asphalt surfaces with the Standard Steel "S-J".

**ON MILD WINTER DAYS**, you can patch dangerous chuck holes with speed. The "S-J" is like a "highway patrol car," always ready for emergency.

**SPRING and SUMMER**, you'll use The "S-J" on all types of jobs, patching, sealing, building shoulders, reshaping curves; for construction of drives, walks, playgrounds, airports and all other secondary construction.

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## TRANSITS and LEVELS

### HEADQUARTERS for REPAIRS - any make

We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

Write for new Catalogue RS-95, of Engineering Instruments, Engineering Field Equipment and Drafting Room Supplies.

#### WARREN-KNIGHT CO.

Mfgs. of Sterling Transits & Levels  
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is currently available in three types—"Para-Lateral" . . . for sealing vertical and overhead joints; "Baseal" . . . for sealing expansion and contraction joints at the subgrade, and "Para-Plastic Coated Sponge Rubber" . . . a pressure seal for vertical angles and overhead joints.

## MANUFACTURERS' LITERATURE

525

### Crane Carrier

A bulletin released by The Byers Machine Co., Ravenna, O., combines a com-

plete description and specifications of the Byers Model 83-CC Crane Carrier. Bulletin No. 249 describes all the features of the crane carrier's independently powered, 35 M.P.H. truck-type chassis upon which is mounted a heavy-duty  $\frac{3}{4}$  cu. yd. upper deck capable of lifting crane loads up to 20 tons and convertible to all front-end attachments. Lifting capacities and specifications as well as overall dimensions are included.

526

### Mechanical Dowel Installer

Operations of the Flex-Plane mechanical dowel installer are covered in a new bulletin issued by Flex-Plane Co., Warren, O. This machine vibrates dowels and tie bars into the concrete slab. The machine rides on forms behind the finisher. Employing on-the-job photographs, the new bulletin shows in detail the operation of this machine. It also covers thoroughly the sharp reductions in cost achieved by its use.

527

### Air Entrained Concrete

An enlightening series of articles on air entrained concrete, written by J. A. Nicholson, well known concrete authority and president of the Nicholson Concrete Co., Toledo, O., has been published and is being made available by the Hercules Steel Products Corporation, Galion, O., manufacturers of hydraulic hoists and dump bodies, and the new Hercules "Aircreter" air entrained concrete dump body. Mr. Nicholson, who operates one of the largest central mixing plants in the middle west and whose success in the application of air entrained concrete has created wide-

spread interest in his methods of operation, presents both the pros and cons for air entrainment in these articles, examining every phase of central mixing plant operations—mixing equipment, controls, testing equipment, aggregates, location of plant in relation to the site of the pouring job.

528

### Air Hose

New York Belting and Packing Co., 1 Market St., Passaic, N. J. has published a new booklet on its various lines of air hose for welding, service stations, underground mining, pneumatic tools and general air drill service. The booklet gives complete data on the applications, construction and specifications for air hose as well as instructions for good air hose engineering practice.

529

### Air Hose

A new catalog section on its line of air hose, published by The B. F. Goodrich Co., Akron, O., features the company's "Highflex" brand, an improved type introduced recently which is stated to be 50 per cent lighter than conventional air hose of the same working pressure. Giving detailed description of the "Highflex" construction and specifications, the catalog section points out that the hose can be used nearly anywhere a  $\frac{3}{16}$  to  $\frac{1}{2}$  in. size is needed. The catalog section also describes and lists specifications on all the other types of air hose the company manufactures.

530

### Dragline Buckets

Revised edition of "How to Get The Most Out of a Page automatic Dragline Bucket" now available through the Page Engineering Co., Clearing Post Office of Chicago 38, Ill. has detailed information on dragline operations. How to select the right size bucket, how the bucket operates, how to use it and care for it to get maximum production, are a few of the subjects discussed and illustrated.

531

### Hose Accessories

A new illustrated condensed catalog published by Hose Accessories Co., Philadelphia, Pa., describes the complete line of LE-HI hose couplings, hose clamps, air valves and manifolds. LE-HI's safety-locking universal coupling, with exclusive self-locking springs, is a featured item in the section dealing with LE-HI universal type quick detachable air hose couplings. Also illustrated and described are LE-HI throttle valves for compressed air service, air hammer hose couplings, special high pressure couplings, long shank couplings for low pressure steam and spray hose and the complete line of LE-HI hose clamps.

532

### Compressors

A new 4-page folder on its "Anto-air" compressors, announced by Davey Compressor Co., Kent, O., contains complete specifications of 60-105-160-210-315 c.f.m. truck-mounted units. It lists the various body types available and contains illustrations of 10 typical assemblies.

533

### Portable Belt Conveyors

A new 8-page bulletin released by Barber-Greene Co., Aurora, Ill., deals with its all-purpose Model 363 portable belt

THEY



*Roll Along*

on ROGERS TRAILERS

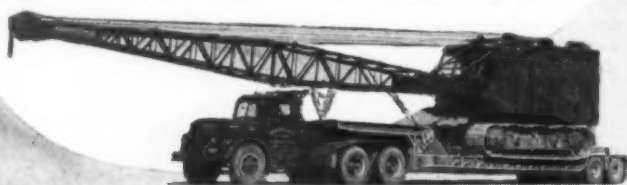
*Everyday Everywhere*

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DESIGNERS and BUILDERS of HEAVY DUTY TRAILERS  
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conveyors. The versatility, adaptability and capacities of the 363's, which are made in lengths of 25 ft., 30 ft., and 35 ft. with plain or cleated belts, are outlined in the booklet. Two pages of applications suggest possible uses that the 363 may be adapted to. Drawings show how the 363 conveyor may be adapted to many conditions. One page of the bulletin outlines other types of Barber-Greene belt conveyors and pictures typical installations in which B-G Equipment is used.

534

### Hardfacing

A new reprint "The Economics of Hardfacing" is now available from Air Reduction Sales Co., New York, N.Y. This reprint originally appeared in article form in "The Welding Journal." The 8-page reprint, profusely illustrated with 14 photographs, reviews the advantages of hardfacing and offers an analysis of the problems leading to the correct selection of the proper hardfacing rods. Design and cost figures are offered, plus a selected bibliography.

535

### Diesel Power Units

The many fields to which users have applied Diesel power are highlighted in a new booklet published by Caterpillar Tractor Co., Peoria 8, Ill. The publication points up installations, drill rigs, rock crushers, mining, water pumps, dredges, pipelines, air compressors, shovels, locomotives and irrigation pumps.

536

### Concrete Drill Bit

A 4-page, catalog containing complete data on the company's line of rotary concrete drill bits has been issued by the Tilden Tool Manufacturing Co., 1995 N. Fair Oaks, Pasadena 3, Calif. Drills listed in the catalog range from 1/4-in. to 4-in. in diameter and from 5 in. to 18 in. in length. Extra shanks up to 36 in. long are also available. The catalog also contains general information on concrete drilling and use of the Tilden rotary drill.

**WITH THE  
MANUFACTURERS  
& DISTRIBUTORS**

### Appointed Sales Manager

E. J. Seifert, President, Pettibone Muliken Corporation, Chicago, Ill., has announced the appointment of Paul E. Lundquist as sales manager of the newly formed Construction Equipment Division. Mr. Lundquist, formerly vice president of Republic Drill and Tool Co., will assist Mr. Seifert on matters relating to the corporation's sales policies, advertising, and the expansion of its line of construction equipment.

### Eaton Axles Now Made in Canada

Through manufacturing arrangements between Eaton Manufacturing Co., Cleveland, O., and The McKinnon Industries, Ltd., Eaton two-speed axle units are now made in St. Catharines, Ont., of Canadian materials and by Canadian labor.

# ***NOW! Curb and gutter work can be profitable***

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## **WITH DOTMAR CURB and THE DOTMAR GUTTER PAVER**

- Three men can pave five linear feet a minute. Once over and it's done. Eliminates placement of division plates and face rails.
- Any standard concrete mix from 1 1/4" down, works perfectly.
- Makes standard, roll over on lip curb and gutter, curb alone, highway gutter, highway dividing curb, highway widening strip. Choice of any screed and strike-off attachment furnished with each machine.
- Lays sound, uniform smoothly finished concrete, to specifications. Pays for itself in first mile of paving.

Send for literature.

\*Names on request.



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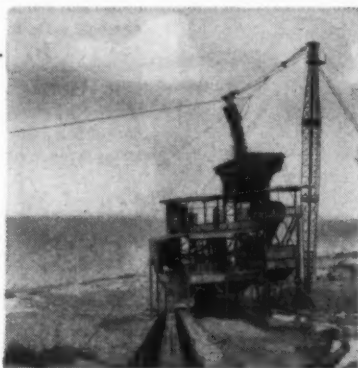
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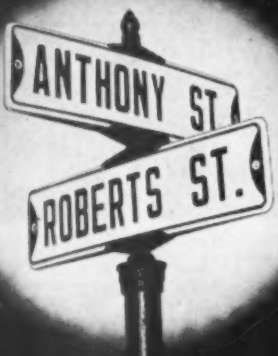
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**BLADES**  
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For any make of machine  
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Wagon Scrapers, Trail  
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Corryalls, Also—

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MOLDBOARDS  
and  
SCARIFIER TEETH

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milled through our own  
rolls and forged at the  
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today.

**Shunk**  
**MANUFACTURING**  
**COMPANY**  
Established 1854  
BUCYRUS, OHIO.

#### Elected Executive Vice President



S. M. Hunter

Mr. Hunter joined the Sales Department of American Hoist in 1936 and has served as vice-president of sales, and a member of the board of directors, since 1945. He also holds board positions with other organizations.

Stanley M. Hunter has been elected to the newly created position of executive vice president of American Hoist & Derrick Co., St. Paul, Minn. The company states that expanding business has made it necessary to create the new managerial post.

#### General Tire Promotes Howes

Charles L. Howes, heretofore Central Division Manager, has been promoted to Southwest Division sales manager for the General Tire & Rubber Co., Akron, O. In the newly-created position of Southwest Division sales chief, Howes will have his headquarters in Dallas, Tex. He will supervise sales operations in the territories now serviced by General's branch office in Dallas, Memphis, Houston, St. Louis, and Kansas City—the principal marketing areas in a 15-state division.

#### Danto Joins Detroit Diesel



R. E. Danto

Raymond E. Danto has joined the sales staff of Detroit Diesel Engine Division, General Motors Corporation, as a market analyst. Mr. Danto has been prominently associated with important automotive research programs for several large car manufacturers. The conduct of extensive customer research and market condition studies as related to General Motors Series 71 Diesel engines are covered in his new assignment with the Organization and Analysis Department.

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#### Koppers Promotions

D. S. Snow, D. D. Hamilton, and J. M. Kamps have been appointed to new positions in the sales organization of the Tar Products Division, Koppers Co., Inc., Pittsburgh, Pa. Mr. Snow, former manager of Pittsburgh district sales, has been named assistant manager of the divisional sales department. Mr. Hamilton has been promoted from manager of building material sales to manager of Pittsburgh district sales. Mr. Kamps, former manager of hot enamel sales in the Pittsburgh district, has been advanced to divisional manager of building materials sales.

#### Butler Heads Radio Division

Edward W. Butler has been appointed director of the Radio Division, Federal Telephone and Radio Corporation, Clifton, N. J. Mr. Butler who was formerly general manager of the Electronics Division, Sylvania Electric Products, Inc., assumed his new duties with Federal on April 25.

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#### POLICY ON MAINTENANCE OF ROADWAY SURFACES

(Adopted January 15, 1948)

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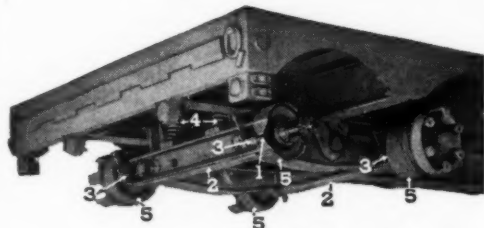


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Deep, wide flange main beams running the full length of the trailer, I-Beam sections for cross-members and outriggers, improved, fabricated gooseneck, and all electric-welded construction. Look at all the other features



found only on Jahn tandem axles: (1) constant lift cam, (2) two full-width axles attached to longitudinal rocker beams, (3) worm gear type slack adjusters at each wheel, (4) heavy coil springs at each axle and (5) positive equalizing braking at each wheel regardless of position of axle.

### C. R. JAHN COMPANY

Dept. 45  
1106 W. 35th St. Chicago 9, Illinois  
Heavy duty trailers from 5 to 100 tons.



### Johnson Joins Meadows



T. R. Johnson

T. R. (Ray) Johnson has joined W. R. Meadows, Inc., Elgin, Ill., as general sales manager. Johnson, formerly sales manager and general manager of Keystone Asphalt Products Co., is well known in the construction and building fields and

brings many years of experience in sales and promotion to the Meadows organization. W. R. Meadows, Inc., manufacturers of "Sealtight" paving and building products are expanding their activities and Johnsons additional abilities are expected to spark this diversification.

### New Gar Wood Distributor

Peerless Manufacturing Corporation, 4300 Bluffton Road, Fort Wayne, Ind., has been appointed distributor of the Wayne Division of Gar Wood Industries, Wayne, Mich.

### Schild Completes New Plant

The Schild Bantam Co., Inc., Waverly, Iowa, manufacturers of the truck mounted Schild Bantam have recently completed their new plant and modern offices. Manufacturing floor space has been doubled and new equipment installed. This new larger plant will enable Schild to step up production and better serve their customer's needs.

### Koehring Promotions

The Koehring Co., of Milwaukee, Wis., manufacturer of heavy-duty construction equipment, has announced major changes in its supervisory staff. President G. E. Long released the news of these promotions: E. A. Brugger was named vice-president in charge of production. A veteran of 32 years service with Koehring, Brugger for the past 10 years, had been general manager of the Parsons Co., a Koehring subsidiary located in Newton, Ia. E. O. Martinson has been transferred to Koehring from the C. S. Johnson Co., Champaign, Ill., another subsidiary, where he was general manager. He is assuming the duties of chief engineer. Martinson spent several years on the Grand Coulee Dam project, the TVA and was chief engineer in the Industrial Ventilating Equipment Division of the American Machine and Metals Co. before joining Johnson. E. W.

Maas, a 31-year Koehring veteran and works manager since 1946, was named vice-president and general manager of the Kwik-Mix Co., the third Koehring subsidiary, located in Port Washington, Wis. In naming Brugger and Martinson to positions at the parent Koehring Company, President Long stated that vice-president R. A. Beckwith would devote his full time to engineering development work at Koehring and its three subsidiary companies. In addition, vice-president F. H. Heine will serve as director of foreign operations and utility officer. Beckwith has been chief engineer since 1940 and Heine was named works manager in 1939 and production manager in 1946.

### New I.H. Appointments

Two new appointments on the advertising and sales promotion staff of International Harvester's industrial power di-



E. O. Martinson



E. W. Maas



E. A. Brugger



*More Dirt Moves Faster When*  
**OWEN BUCKETS**  
*swing over dump trucks*

This claim is strongly substantiated by the increasing numbers of excavating contractors who have standardized on Owen Buckets to "Insure a Bigger Day's Work".

Long popular, Owen design and construction characteristics make for consistent "ease of operation" with "A Mouthful at Every Bite" and a clean and rapid discharge.

**THE OWEN BUCKET CO. 6070 Breakwater Ave., Cleveland, O.**

BRANCHES: PHILADELPHIA • CHICAGO • BERKELEY, CALIF.

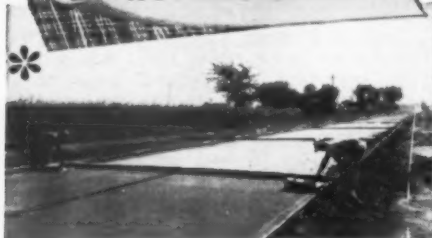


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\*More than a half-mile of steel-like reinforcement per square yard.

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The SISALKRAFT Method of curing concrete roads actually cuts curing costs as much as 50% . . . saves you time, labor and money. With reasonable care under normal job conditions, you can get 15 uses or more from genuine SISALKRAFT Curing Blankets. Use them this year and see for yourself!

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vision have been announced by M. F. Peckels, manager of IH's consumer relations department. They are W. H. Kuhlman as general supervisor of advertising and sales promotion, succeeding Donald Jones, and J. R. Roberts as supervisor of sales promotion, a post formerly held by Mr. Kuhlman. Mr. Jones assumes new duties as general supervisor of refrigeration advertising and sales promotion for IH.

#### Euclid Promotions

V. L. Snow has been appointed domestic sales manager of The Euclid Road Machinery Co., Cleveland, O., succeeding the late W. W. Paape. Mr. Snow joined the engineering department of Euclid in



J. W. Bloomquist



V. L. Snow

1935. He served as assistant chief engineer until 1942 when he was placed in charge of industrial sales and the sales development department. Succeeding Mr. Snow as assistant sales manager is J. W. Bloomquist who joined Euclid as district representative for the Minnesota territory in 1945.

#### Hammond Joins Marion Metal



W. H. Hammond

W. H. Hammond, of Detroit, Mich., has been elected vice president in charge of sales of Marion Metals Products Co., Marion, O. Mr. Hammond is widely known in the automotive dump body and hydraulic hoist industry, having been associated in that field since 1922. In 1934 he became sales manager of the Hoist and Body Division of Gar Wood Industries, Inc., and in 1942 was elected vice president in charge of sales of all divisions of that company, from which position he recently resigned. In his capacity with the Marion Metal Products Co. he will supervise all domestic and export sales activities and will be assisted by Harold H. Jacobs, sales manager.

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#### Appointed Asst. Sales Manager

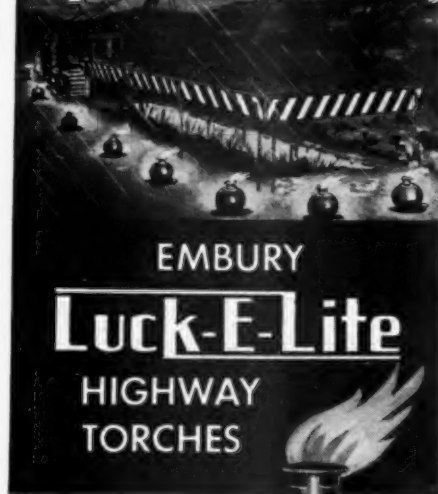


J. B. Pegram

been sales engineer for the Thompson Products Co. Prior to that time, he was with the engineering division of the Navy Bureau of Aeronautics.

McCulloch Motors Corp., Los Angeles, Calif., manufacturer of power chain saws, has announced the appointment of John B. Pegram as assistant sales manager. Mr. Pegram comes to the McCulloch organization from Cleveland, where he had been sales engineer for the Thompson Products Co. Prior to that time, he was with the engineering division of the Navy Bureau of Aeronautics.

THEY'RE ALWAYS ON  
GUARD WHEN THE  
BLOWING IS HARD!



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**Luck-E-Lite**

HIGHWAY  
TORCHES



Give You Highest  
Dependability  
at Lowest Cost

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#### NEW 20-TON CAPACITY

In addition to the 7-ton (single axle) and 12-ton (double axle) a new, giant 20-ton, power operated TIP-TOP Trailer will soon be available . . . watch for the announcement.

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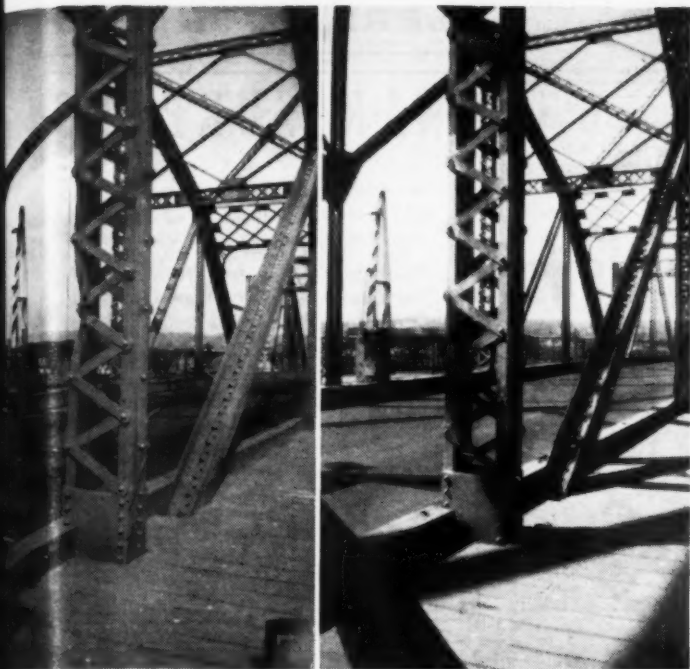
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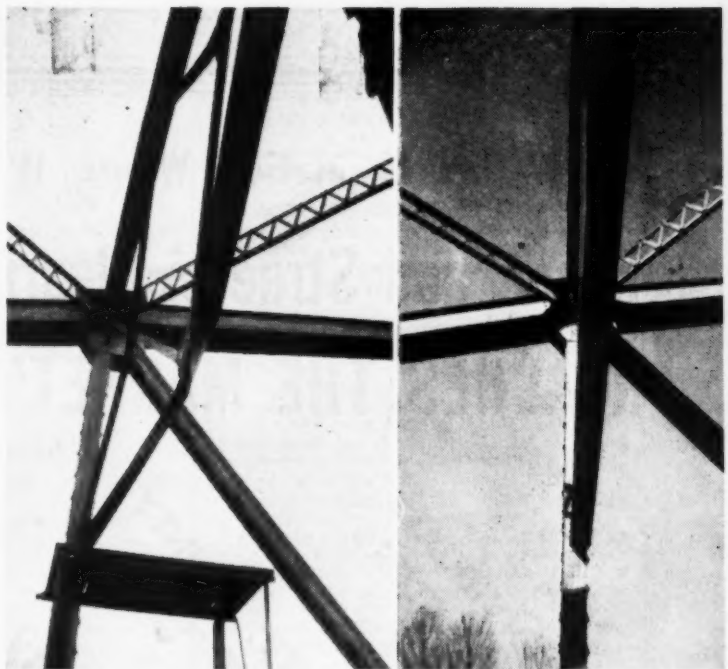
### Damaged Bridge Members Fixed by Welding Methods

These "before" and "after" scenes of bridge repair work were sent us by Joseph Holt of Joseph Holt and Company, Seattle, Washington. They illustrate very well the practical restoration work that can be done with skillful welding where bridge members are bent or distorted. This company specializes in straightening damaged bridge members

in place without closing the bridge to traffic.

According to Mr. Holt, an oxyacetylene torch is applied and the heat controlled in such a way as to make the metal return to its original place. Expansion and contraction from heating and cooling are carefully capitalized after a study of each problem.

Mr. Holt has been working in this specialized field since 1920, and is the author of a book titled "Contraction As a Friend in Need."



### No More Bridge Tolls

A bill to provide permanent freedom for Tennessee's toll bridges was given final passage by the state legislature and sent to the governor.

Toll collections on the eight bridges were suspended two years ago until March, 1951, after a statewide campaign for such action. The new measure will lift the tolls permanently.

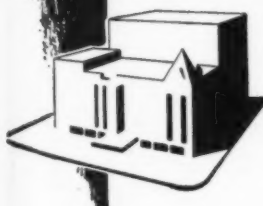
## COMING TO CLEVELAND

**NEW  
VISIT THE<sup>1</sup>HOLLENDEN...  
COMPLETELY REDECORATED**

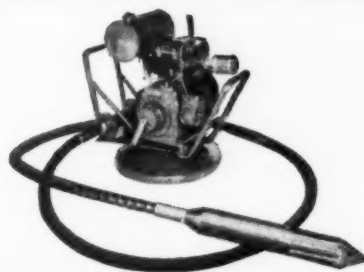
- ★ 1000 rooms with bath
- ★ Radio in every room
- ★ Six fine restaurants
- ★ Central downtown location
- ★ Garage attached

## HOTEL HOLLENDEN

ROBERT P. JOYCE  
GENERAL MANAGER



*Home of the famous  
Vogue Room*



### White Concrete Vibrators Have Many Noted Features

which have made them highly successful all over the world.

**DEPENDABLE FLEXIBLE DRIVE.** All sections are interchangeable, in multiples of 7' and 12' lengths. No special sections are required. Each casing has ball bearing connector. Each alloy steel core has slip joint which does not separate in service. It prevents stretching and overheating. No limit to length of drive.

**RELIABLE VIBRATING HEADS.** Also interchangeable and can be applied to any drive section. Heads can be opened for repairs. Rotor mounted on double row ball bearings. Alloy steel external ribs reduce wear.

**STANDARD POWER UNITS.** Well-known gasoline engines and electric motors. Can be serviced almost everywhere.

**CONCRETE GRINDERS.** Speed reducing heads, to hold wheels, can be attached to any drive section.

*Write for Circular*

**Elkhart White Mfg. Co. Indiana**

NOW! Get Circulation Where It Counts . . .

## Roads and Streets' Clearing House REACHES THE MARKET'S HEART

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CITY, COUNTY  
ENGINEERS

CITY, COUNTY  
OFFICIALS

Long a leader serving the heavy construction and associated fields, **ROADS AND STREETS' "cream" circulation** goes to the important men in the business. They are the men, who directly or indirectly influence the purchase and sales of new and used equipment and supplies.

When you are "in the market," reach the logical buyer or seller quickly — at a reasonable cost to yourself.

Use the Clearing House!

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Final closing date is the Fifteenth of the preceding month magazine is issued last of publication month. If proof desired, copy must be received 5 days preceding closing date.

### CLEARING HOUSE SECTION ROADS AND STREETS

22 W. Maple Street, Chicago 10, Ill.

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## CLEARING HOUSE

### WAR SURPLUS

8 Quick-Way truck cranes for truck mounting, Model E, 30 ft. boom. \$2,500 each. 2 Quick-Way's on Coleman trucks, \$3,500 each.

1 Koehring Model 304. Brand new, on Corbett crane base. 6 x 6.14-20 tires. Truck has been used some.

1 Osgood Model 200. Just like like new. Price \$8,000. Crane only.

General Crane, ¾ yd., 35 ft. boom and fairleads, with Page ¾ yd. dragline bucket, \$3,750.

**H. R. DOUGLAS**

Tel. West 3-3305

1133 N. 25th St., Milwaukee

### CRUSHERS

GYRATORY: 30" Super. McCully; 36" Allis-Chalmers; also Nos. 12, 10, 9, 8, 7½, 6, 5, & 4. JAW TYPE: 24x36, 25x40, 22x50, 30x42, 42x48, and smaller sizes down to 7"x9". REDUCTION TY: 2', 3', 4' & Symons Cone: Nos. 19, 25, 37 & 38 Kennedy; 38" Traylor TZ. 1'8" & 2'4" TY: No. 36 Telsmith Gyrospere; 7 & 10" Newhouse; Stedman 30 x 36" Imp. Type. ROLLS: Allis-Chalmers 72x30, 54x24, 54x20, 40x15 & 18x10. Pioneer 18x30. Universal 16x24. New Holland 24x16 & 16x16. McLanahan 30"x60", 18x24 & 18x30 Single Roll. Also others. HAMMERMILLS: Williams Nos. 2, 3, 4, & 6; Day No. 40 & No. 70; Gruendler 2XB & 3XB; Dixie 2024 & 3650. MILLS: Hardinge 3'x8", 0'x22", 0'x3', 8'x3' & 8'x4'; Kennedy 4x8, 5x6, 5x11; Marcy 4x5, 6x1; Smith 16B Tube Mills; Raymond 4 & 5 Roller Mills; Bonnot, Fuller, Sturtevant & others. CRUSHING PLANTS: 25x40 Cedar Rapids Portable. Diesel Power. Others portable & stationary. BINS & BATCHERS: 70 & 150 yd., 3-comp., Etc. TRUCKS: Euclid, FWD, Internationals, Etc. SHOVELS: 80-D Northwest 2½ yd. combination Link Belt Speeder K-580, 3 yd., and others. DRAGLINES: 6 Yd. Walker, 145' boom, Diesel Lorain Model 40-A Crane-Dragline, Diesel.

### MISCELLANEOUS ITEMS

Barges, Bins, Buckets, Boilers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryer, Derricks, Elevators, Excavators, Generators, Hoists, Kiln, Draglines, Drag Scrapers, Dredges, Drills, Engines, Locomotives, Loaders, Motors, Pipe, Pumps, Rail, Scales, Screens, Slacklines, Shovels, Tanks, Trucks, Tractors, Etc., in many sizes, types and makes at low prices. (I have equipment at many points in the United States and Canada. What you need may be near your plant.)

MARIETTA ALEX T. McLEOD KANSAS

### FOR SALE

La Plant-Choute C-84 Scraper. 13-16 yd. capacity. Equipped with four 18:00 x 24 Tires. Price \$1950.00.

HUBSON AND COMPANY  
2131 Washington St.  
Kansas City 8, Missouri

### GOOD USED EQUIPMENT FOR SALE

'47 Badger Trenching Machine—full track  
D-2 Caterpillar Dozer  
T-6 International Dozer  
TD-9 International Angle Blade  
Bay City 25½ yd. shovel  
'46 Bay City 45¾ yd. back hoe  
'47 P&H 150 Truck Crane 65' Boome—20' jib  
'47 P & H 255-A ¾ yd. back hoe

Box 599 FLINT EXCAVATING CO. Flint, Michigan  
Phone 3-5883

### FOR SALE

#### Practically New

1—100 ft. Pioneer conveyor with 30" belt complete with V-belt drive and 7½ H.P. motor. Only used 4 months. F.O.B. Wapakoneta. \$3,400.00.

2—Morrow Model 60 Sand drags complete. Tank No. 1 with drive and Tank No. 2. Combined capacity approx. 40 to 50 tons per hour. In very good condition. \$950.00.

Subject to Prior Sale

WAPAK SAND & GRAVEL CO.  
Phone 7761 Wapakoneta, Ohio

## FOR SALE — USED EQUIPMENT

- 1—Barber-Greene 44 ditcher
- 1—Koeching ¾ yd. crane \$3,000.00
- 2—Bell Prime Movers (almost new)
- 1—Blaw-Knox 1 yd. clamshell bucket
- 1—Blaw-Knox ¾ yd. clamshell bucket
- 1—Blaw-Knox ¾ yd. clamshell bucket
- 1—Bucyrus-Erie 10B, ¾ yd. shovel \$6,500.00
- 1—Bucyrus-Erie 20B, ¾ yd. clamshell machine \$7,500.00
- 1—Link-Belt ¾ yd. clamshell machine \$3,750.00
- 3—Bottom Dump Euclids \$9,500.00 each

- 1—Fordson tractor \$250.00
- 10—Gardner-Denver 4" tunnel drifters
- 1—Godfrey coal conveyor
- 2—Ingersoll-Rand Model 315 portable compressors
- 6—Ingersoll-Rand GK-105 portable compressors
- 1—International TD-9 dozer \$4,000.00
- 1—International TD-18 dozer \$4,500.00
- 1—Allis Chalmers HD-14 Tractor
- 1—Caterpillar RD-6 w/ almost new cable bulldozer \$4,000.00

## BRANDEIS MACHINERY & SUPPLY CO., INC.

Brook & Warnock Sts.  
Louisville 8, Ky.  
CAIhoun 4741

P.O. Box 27  
Evansville, Ind.  
3-4491

## FOR SALE

- 1 Model 3500 Manitowoc Shovel D-17000 Caterpillar Motor, 45 ft. boom, 35 ft. stick and 100 ft. crane boom with fair lead attachments. Serial No. 3592.
- 1 Model 3500 Manitowoc Shovel D 17000 Caterpillar Motor, 45 ft. boom, 35 ft. Stick. Serial No. 3606.
- 1 Model 820 Lorain Shovel, 2 cu. yd., D 13000 Caterpillar Motor, Serial No. 17,748.
- 1 D-8 Caterpillar Tractor with LeTourneau hydraulic blade. Serial No. 2U-888.
- 3 D-8 Caterpillar Tractors with Caterpillar cable blades. Serials #2U-1395, #2U-1500, #2U-2291.
- 1 T D International Tractor with Bucyrus Erie blade. Serial TD-R-4042-T-4.
- 1 LeTourneau Dozer Serial #LD-2371-C2C. New August 1948.

We own the equipment we advertise.

CHARLES P. ALLEN, INC.  
1201 Childs Ave. Drexel Hill, Pa.  
Tel. Phila. Sunset-7910

## FOR SALE

- 2—Caterpillar 12 Patrols. Serial No. 9K6354. Large tires in front fully equipped.

Also tractors and other patrols. Can be inspected at our yard at any time.

- 1—604 Koeching 1½ yd. with Caterpillar D13000 engine, completely equipped with 60' boom and cables. Price \$17,000. Ready for work.

## NORTHERN CONSTRUCTION EQUIPMENT CO.

2831 UNIVERSITY AVE., S.E.  
MINNEAPOLIS, MINNESOTA  
GLADSTONE 7482

## CONTRACTORS EQUIPMENT

### For Sale—Direct

- Allis-Chalmers Motor Grader—Mdl. AD
- Mack Platform Truck—Mdl. B.Q.
- 7000 ft. Blaw Knox Road Forms—7" & 8"
- 2—LeTourneau Scrapers—Mdl. LP
- 5—Koeching Trail Dumps—GM Diesels
- 2—Morris 12" Centrifugal Pumps
- Butler 105 Bbl. Cement Bin with Scales

Location—New York State

LOUIS MAYERSOHN  
36 State St., Albany 7, New York

## BARGAIN PRICES

### USED DRAGLINES, SHOVELS, CRANES, AND BACK HOES

½, ¾, 1 and 1 cu. yd. sizes

Call or Write Now

WABASH EQUIPMENT & SUPPLY CORP.  
WESCO  
Construction Equipment, Distributors in Indiana  
310 Test Building  
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Phone: ANTHONY 1453

## BRIDGE BUILDERS & MATERIAL HANDLERS

## 3 MANITOWOC CRANES

### FOR SALE

Valley 3161

V. P. SERODINO, Inc.

7. W. North Bend Rd. Cincinnati 16, O.

## FOR SALE

1948 TL-20 Moto Lorain Cranes—good condition 30' booms, 5' extensions, generating power plants, magnet reels.

1—Blaw-Knox. 300 barrel cement bin complete.

Huber 4-5 ton tandem roller.

Rex 4"-6" Centrifugal water pumps, gasoline engine, suction discharge hose.

Jaeger 2" centrifugal pumps, gasoline power.

Jaeger 1½" centrifugal pumps, gasoline power.

Blaw-Knox finishing machine adj. 10-14 ft.

Heltzel finishing machine adj. 10-14 ft.

1939 Ford V-8 truck with Davey 105 ft. compressor mounted. A-1 Condition.

Sullivan 105 ft. Compressor, pneumatic tired 2 wheel mounting.

Ingersoll-Rand 85 ft., 105 ft., 315 ft. Compressors, pneumatic tired mounted.

Road forms 7"-8"-9".

Osgood Invader ½ yd. Combination 30' Crane, shovel, backhoe.

Michigan TLDT-20 mobile crane, 12 ton, 30' boom 5'-10' extensions, generator, Rudomatic tagline winder.

Gardner-Denver 210 cu. ft., 2 stage gasoline powered compressor, 4 wheel pneumatic tire mounting.

Cutler Hammer 29" magnet (like new).

Subject to prior Sale

## WEPCO EQUIPMENT CO.

3366 Independence Road  
CLEVELAND, OHIO

## FOR SALE

½ Yd. Byers Model 62 Shovel, also has 30 ft. boom with 10 ft. extension and ½ yd. dragline bucket.

BEST OFFER TAKES

CHEMSTONE PRODUCTS CO.  
1520 E. Minnehaha St. St. Paul, Minnesota

## 2 Caterpillar Tractors D-8s

### 7 Super C Tournapulls

condition fair to excellent—ages 2-4 years

3 Cat DW 10's/CW 10 Scoops

new in 1945. Low hours and good shape

Located on jobs Ohio and Michigan

We'll rent or sell . . . Wire us for more details if you have work for this type equipment.

The Lewis & Frisinger Co.  
Ann Arbor, Michigan

## FOR SALE ROTARY DRYERS

NEW AND USED  
ALL SIZES

P. R. PERKINS, SKOKIE, ILL.

## FOR SALE

Insley Crane K-12. Two years old. Buckeye No. 410 trenching machine. Bulldozer—International TD-14 cable blade. Two years old. Equipment all in first class condition. Located at Elkhart, Ind.

HAINES & HAINES

2526 S. Main St. Elkhart, Ind.  
Phone: Walnut 5136

## POWER PLANT

Onan 10 K.W., 110 & 220 volt A.C. Army surplus. Used 10 hours. \$750.00

IRVING BROS. GRAVEL CO.

Plant located 6 miles east of New Haven, Ind. on Route 24  
Phone Woodburn 120

## FOR SALE DIRT MOVING MACHINERY

**BARGAIN PRICES**  
**Deal Direct with Owner**

7—D-8 Caterpillar Tractors with 7 LeTourneau Scrapers. Serial numbers — 1H6367; 1H8321; 1H7020SP; 1H8339; 1H3971SP; 1H4749SP; 1H8320; S8571WE; S8568WE; S8569WE; S11063WE; S8599WE; 6746YR13; 6807YR13. All the above units are in good working condition. The Tractors are equipped with lights, DD-PCU and push plates. The W Scrapers have 18 x 24 duals all around and the F Scrapers have 18 x 24 duals in rear and single tires in front. Seven Tractors and Seven Scrapers ready to work.....\$75,000.00

Subject to prior sale of the above, we offer two D-8 Caterpillar push cats equipped with lights, DD-PCU and push plates (one tractor has high reverse gear), very good condition, both Tractors for .....\$19,000.00

6—Super "C" Tournapulls, C3T-2858CIF; C3T2854CIF; C3T-2860CIF; C3T2850CIF; C3T-2841CIF; C3T2859CIF; all in good working condition .....\$25,000.00

1—Lorain "40" Crane, 2699, new motor and radiator.....\$3,000.00

1—G.E. 300 Amp. Electric Welder mounted on two pneumatic tires powered with Mercury V8 motor, also spare V8 motor.....\$400.00

2—Gardner-Denver Air Compressors, WBD1310 and WBD1312 .....\$800.00 each

3—Semi-Trailers 30 ft. long, equipped with good dual tires, brakes and built-in parts bins. Very good condition.....\$1,000 each

1—Armco repair shop building 76 x 24 x 14 with four large doors, in very good condition. Was erected, new, on present foundation in 1948.....\$2,000.00

Miscellaneous: Portable Alemite power grease units, light plants, spare PCU's, new 18 x 24 tires, several spools ½ inch cable, heavy duty Rome breaking discs, 40 drums Swan Finch roller grease, Caterpillar parts, LeTourneau parts and Cummins parts.

All the above may be inspected at the site of a completed levee contract near Prairie du Rocher, Illinois. Mail address

**McVAUGH HAYNES CO.**  
PRAIRIE DU ROCHER, ILLINOIS

## FOR SALE TRUCK MIXERS

### USED—REBUILT

Good, Dependable, Used Equipment at prices less than you would expect to pay.

1—Jaeger 2 Cu. Yd., #J9939, Mod. 2HM7L, new Fall of 1948, less than 60 days use, big discount

5—Smith 2 Cu. Yd., some mounted on Trucks

6—Rex 2 Cu. Yd., Rebuilt

3—Jaeger 4 Cu. Yd., mounted on White 4x6 Trucks

2—Smith 3 Cu. Yd.

2—Jaeger 3 Cu. Yd.

1—2 Cu. Yd. Schmidt Agitator

Complete information, including photographs, mailed upon request.

## FUNKHOUSER MACHINERY CO.

2425 Jefferson Kansas City, Mo.  
Harrison 4367

## PAVING EQUIPMENT BARGAINS

In guaranteed good operating condition, ready for work

1—Dual Drum 34E Koehring Paver

1—Large Drum Koehring 2A, 27E Paver

1—Link-Belt Speeder, ¾ yd., crane dragline. Late Model

1—P & H 1 yd. Crane

1—Hobart gas driven Arc Welder, 300 AMP

1—Cedar Rapids Jaw Crusher 9 x 36

1—Flexplane Finishing Machine (Heltzel 22 ft. steel wheels, Waukesha Motor

1—Bucyrus-Erie 37B, 1½ yd. Shovel, Crane and Dragline

**HUNTER TRACTOR & MACHINERY CO.**  
329 SOUTH 16TH STREET  
MILWAUKEE 3, WISC.

## "GOOD ROADS CHAMPION" JAW CRUSHERS

### Used and Factory Rebuilt

1—Good Roads No. 1030 (10" x 30") Roller Bearing Jaw Crusher, Latest Model, Used, A-1 Condition.

1—Good Roads No. 1040 (10" x 40") Roller Bearing Jaw Crusher, Latest Model, New Shaft and Bearings, Used, A-1 Condition.

1—Good Roads No. 6 (12" x 26") Primary Crusher, Complete Factory Rebuilt, New Crusher Guarantee.

1—Good Roads No. 20 (22" x 50") Primary Crusher.

**AMERICAN GOOD ROADS MACHINERY COMPANY**

BRYN MAWR, PA.  
Phone 2764

## FOR SALE

1—Remanufactured 1948 Model 200 PARSONS Wheel-type Trenchliner with IHC U-9 gasoline engine.

1—Remanufactured GALION Model 401 Motor Grader with 10' blade, 7-tooth scarifier, IHC U-4 gas engine.

1—Remanufactured WORTHINGTON Model 210 Air Compressor, gasoline driven.

**THE W. W. WILLIAMS CO.**

835 Goodale Blvd.

MAIn 6751

Columbus 8, Ohio

## CLEARING HOUSE

### FOR SALE

1—Sullivan 105 cu. ft. diesel on 2 pneumatic tired wheels. \$2,500.

1—Bullet Toro tractor. Practically new 1946 Model. Ideal for golf courses, cemeteries, etc. \$950.

1—Lorain 40A ¾ yd. Dragline with back hoe attachment in excellent condition. \$9,950.

PHONE—WIRE—WRITE

**FALLS CITY SALES CO.**

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### FOR SALE SWEEPER

Gasoline operated, self-propelled, pneumatic tires, manufactured by Austin-Western—Serial No. P-1608—like new.

**MAYER POLLOCK**  
POTTSTOWN, PENNA.

### FOR SALE

Shovel Front Lima Paymaster ¾ yd. Never—never used. Bargain. Link-Belt 50½ yd. Combination, 2 yrs. old. Repair Parts for G.I. Trucks—Reo heavy-duty Trucks. Equip. for off-the-highway service.

**WERNER MOTOR & EQUIP. CO.**  
320 N. Fifth St., Springfield, Ill. Ph. 3-0751

### WOOD ROAD MIXER

New 1948, Model 54, mixed only two weeks, Like New

Write or Phone

**JACK McCUTCHEON, Contractor**  
DODGEVILLE, WISC.

### FOR SALE

1—WAUKESHA gasoline Engine DU306-D in good condition from KOEHRING 27-E Paver \$150.00

**ANDREWS CONCRETE PRODUCTS AND SUPPLY CO.**  
620 N. Massachusetts Ave. P. O. Box 594  
Mason City, Iowa

### WANTED

D7 TRAXCAVATOR—7M Serial or later ¾ Yd. Crane and Clam. Late model diesel.

**JACK RODEGHIER**  
128 COLLINS ST.  
JOLIET, ILL.

1—30"x13" Farrel Bacon Jaw Crusher Type D, low front with repair parts .....\$1,000.00  
1—D-12, K38 American Pulley Base ..... 100.00  
1—60 H.P. 1160 RPM 440 V. 60 cyp., 3 phase motor, with switch, controller and resistance, mounted on frame ..... 1,400.00  
1—12" Compass Endless Belt ..... 100.00  
1—24" Gyraseph Crusher Shop No. 6173. 4,000.00  
1—40 HP 860 RPM 440 V. 60 cy. 3 HP Motor with switch, controller and resistance mounted on frame ..... 1,000.00  
1—10B Telsmith Gyratory Crusher Shop No. 1410 ..... 1,800.00  
1—13B Telsmith Gyratory Crusher Shop No. 1459 ..... 3,500.00  
1—Shovel Front for 10B Bucyrus-Erie with ¾ Bucket ..... 450.00  
2—Single drum Clyde friction elec. hoists with 7½ HP motors, 220V. 60 cy. 3 phase, rope speed 35 ft. per min.; Pull 5,500 lbs. ....350.00 ea.  
1—48" wide x 32'0" lg. Link-Belt Dewatering Flight Conveyor similar to cut in Link-Belt Catalogue No. 800, Page 1184 ..... 2,500.00  
2—New No. K-4400 3 compartment Blaw-Knox aggregate bins with No. 125DTM aggregate batchers and springless ..... ea. 8,000.00  
1—2'0" wide x 158'0" lg. S8FR Dorr Classifier Serial No. US3579 less motor ..... 1,152.00  
1—2'0" wide x 15'0" lg. D8FR Dorr Classifier Serial No. U.S.3580 less motor ..... 1,548.00  
1—Ingersoll-Rand Compressor Class ERI Shop No. 39442, size 10"x10" complete with idler and endless belt but not motor ..... 200.00

**THE ARUNDEL CORPORATION**  
Pier 2, Pratt St.  
Baltimore 2, Md.

## CLEARING HOUSE

### FOR SALE

Subject to Prior Disposition

No. 304 Koehring dragline, Serial C-4875 with 40 ft. boom, Swamp Tracks, GM Diesel motor, 1 yard Hendrix bucket .....\$12,000

"Caterpillar" #66 Pull Grader, Serial 6C-753, 12 ft. blade.....\$1,000

"Caterpillar" RD7 tractor and dozer, #9G-5281 .....\$5,000

"Caterpillar" D7 tractor and dozer, Serial 4T-7392.....\$9,000

Above equipment on my yard and near Jackson; in good working condition; as is, where is.

If these prices are not high enough, make me an offer.

### CLIFFORD WATERHOUSE

P. O. Box 172 Jackson, Miss.  
Phone: 2-0617

### FOR SALE

- 1 1947 Model Byers Junior Shovel.
- 1 24" Troughing Belt conveyor 80' long with gasoline engine.
- 1 Koehring Model 301 ¾ yd. shovel front.
- 1 Byers Model 80 ¾ yd. shovel front.
- 1 Model 522 Barber-Greene bucket loader.
- 1 New Universal 2 yd. batcher.
- 1 Used 1 yd. batcher.
- 1 Erie GA-52 yd. bin complete with dial scale.
- 1 Completely enclosed bucket elevator, 20' long.
- 1 Ransome ¾ yd. stationary mixer complete with electric motor.
- 1 Knickerbocker 1 yd. stationary mixer complete with gasoline engine.
- 1 Universal 9" x 12" Jaw Crusher.

### SERVICE CONSTRUCTION & EQUIPMENT COMPANY

6335 Manchester Avenue  
St. Louis 10, Missouri Tel.: Sterling 7078

## Bargains in used CONSTRUCTION EQUIPMENT

TRACTOR AND DOZER, "CATERPILLAR" D7, 4T-series, 2300 hours on hour meter. LeTourneau bulldozer and double drum power control unit. Reconditioned here in our shop. Shop Repair Order available for customer's inspection .....\$10,500.00

TRAXCAVATOR, "CATERPILLAR" D4, equipped with 1-yd., 73-in. bucket. Reconditioned and ready to go .....\$5,250.00

MIXER, JAEGER, 1-bag, non-lift; with power loader; mounted on 2 pneumatic tires. A real bargain at .....\$355.00

PUMP, JAEGER, centrifugal, Model 4XP, Serial No. P8396, 30M G.P.H. Complete .....\$395.00

AIR COMPRESSOR, INGERSOLL-RAND, on skids, suitable for truck or trailer mounting; 35 cu. ft., air cooled with 4-cyl. engine. Late type. Good condition .....\$450.00

Write—F. L. BENNETT

800 West Main Street, Louisville, Kentucky  
for details and complete used equipment catalog

## Roy C. WHAYNE SUPPLY COMPANY

EVANSVILLE IND. LOUISVILLE KY. PADUCAH KY.

### FOR SALE

TD-18 International tractor, used 1700 hours.

Bucyrus-Erie hydraulic dozer with front end pump.

Bucyrus-Erie P-25 winch.

Bucyrus-Erie S-90 four wheel scraper, used 500 hours.

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General Model 307—3/4 yd. Crane & Backhoe \$12,000.00  
Buckeye Trenching Machine, Model C-20 7,500.00  
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12 each—8-10 c.y. Bottom dump Euclid Wagons 500.00 each.  
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1 P & H 255A 20 Ton Truckcrane.....	\$15,500.00
1 NW-25 3/4 yd. dragline gas motor.....	\$ 8,000.00
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60% of list

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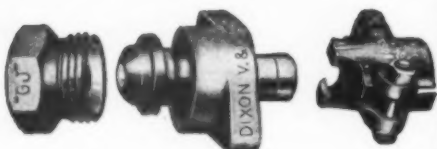
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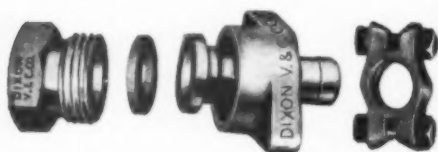
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